Insure VICTORY ... — Buy Bonds for War ... — Push Plans for Peace

Contractors and Engineers Monthly

Vol. 41, No. 2 FEBRUARY, 1944 $2 a Year, 20 Cents a Copy

Highlights Of This Issue

Winter Maintenance
Open roads in winter were demanded by the public before the war; now they are essential to the war effort. A detailed description of Minnesota's organization and equipment for snow removal and ice control, as well as that of a New York county in the heavy-snowdrift area, appear in this issue.
See pages 1 and 47.

Wartime Care of Bridges
The problem of wartime bridge maintenance is particularly important in states with a large number of wooden bridges. The solution of this problem in Georgia, and the operation of a state-owned sawmill and wood-preservative plant for bridge timber, are described in a group of three articles. See page 2.

Airport Construction
The extension of an Army airfield in the South to meet war needs involved more than 1,000,000 square yards of concrete paving for runways, taxiways, and aprons. A feature of the work was the contractor's exceptionally well organized paving outfit. See page 2.

Salvaging Old Roads
Most highway work being done today is salvaging worn-out pavements, to save the investment made in them and to keep them carrying war traffic. Examples of this type of work in Oklahoma, Ohio and Indiana are described in this issue. See pages 9, 22 and 40.

At the Fighting Fronts
The job being done by construction equipment right up where the shooting is going on is told pictorially in this issue, where familiar machines are shown carrying the war to the enemy.
See pages 36 and 37.

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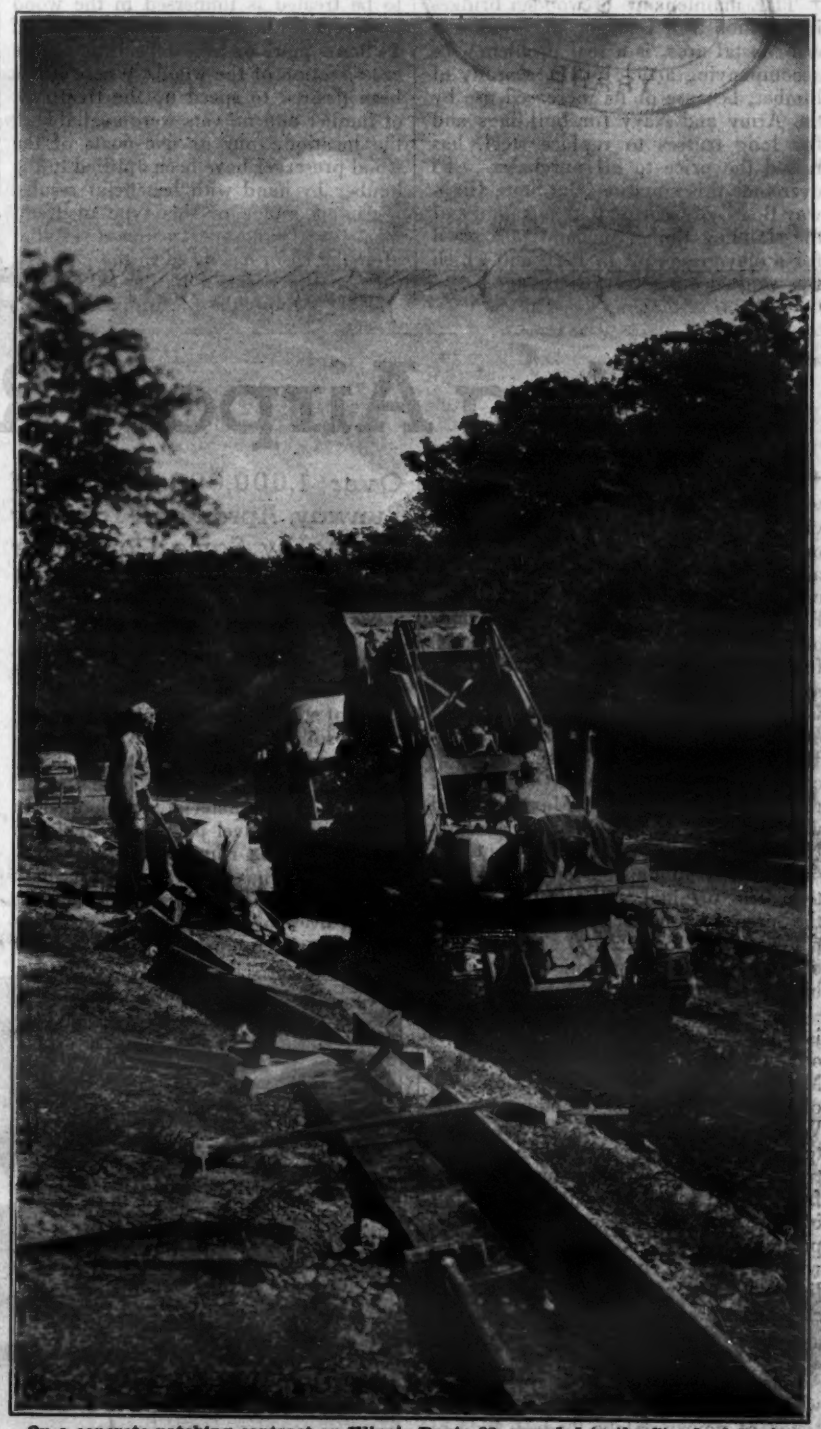
Open Roads in Winter In Spite of Difficulties

CONCRETE ROAD MAINTENANCE IN ILLINOIS



On a concrete-patching contract on Illinois Route 29, awarded to the Standard Paving Co. of Chicago, a Trancavator mounted on a Caterpillar D4 removes a section of damaged pavement preparatory to placing a patch of new concrete.

Minnesota Snow Fleet Has Added Troubles in Wartime But the Traffic Must Move; How the Job Is Done

By FRANK B. SARLES,
Field Editor

(*Photos on page 72*)

✦ ALWAYS conscious that, in any northern state subject to months of snow and cold, people may suffer and die because the roads are blocked, Minnesota's State Highway Maintenance Engineer, C. L. Motl, works much and rests little when his snow-fighting forces are in action to prevent possible occurrence of a tragedy during one of its sub-zero blizzards. Wartime problems, such as the loss of both equipment and trained personnel to the armed forces and to industry, have made the job even tougher, but still the Department continues to win its battles with Winter.

It should not be inferred that Minnesota is a land of continuous blizzards. Severe storms which block highways and tie up traffic generally are the exception. One really severe blizzard each winter is about the average. Some winters there may be more, other years there are just light, though frequent, snowfalls, and sometimes no snow at all. In addition, Minnesota is a big state, and only rarely does a storm cover the whole state at one time. A real blizzard is a combination of several inches of fresh snow, high winds, and sub-zero temperatures lasting over a period of several days. But storm or no storm, the snow fighters are ready and prepared for the worst, since no one can foresee accurately what may happen as each storm develops.

General Organization

The general organization for snow removal in Minnesota is the same as for other highway maintenance. The Maintenance Engineer, with two principal assistants, is headquartered in the office of the Department of Highways at St. Paul. During an emergency, one of the assistants is always on duty and can be reached with messages calling for shifting of equipment from various parts of the state, should this move become necessary or advisable. Eight District Engineers exercise a general supervisory function, one over each two maintenance districts, but their responsibility for snow removal is not as great as it is for construction and general maintenance in their districts.

The men who really direct the battle,

(*Continued on page 14*)

Bridge Maintenance Problems in Georgia

Concrete Structures Offer Least Trouble, But Steel And Timber Predominate; Special Crews Organized

✦ IN the period between 1920 and 1926, when Georgia began the development of its state highway system, many wood bridges were built of treated native southern yellow pine and untreated cypress in the southeastern coastal section. These were built to make the highway dollar go as far as possible by avoiding the more expensive types of construction. The bridges were designed for 10-ton loading and for a life expectancy of 15 to 20 years. Many of these structures had already been rebuilt and strengthened before the war, but far too many are now carrying 20-ton and greater Army and war-production-plant traffic over their 18 and 18½-foot roadways. The great problem in Georgia today is to extend the lives of these bridges through the war until a post-war construction program can replace them with more modern longer-life structures.

Reinforced-concrete and steel bridges were built over a few of the major streams. The reinforced-concrete structures have required no essential maintenance, but the steel bridges, mostly in the coastal section where they are exposed to the ravages of salt air, do require regular maintenance painting.

Wood Bridges

One of the critical conditions in the state is found at the Piney Bluff Bridge on U. S. 1. This is a treated-timber bridge 4,007 feet long with a swing span. It carries a roadway 18 feet wide, has two 100-foot spans and the swing span of 208 feet. Heavy Army traffic uses the bridge constantly, causing such vibration that it is necessary to have a maintenance crew at the site most of the time. It was built in 1927 for 10-ton loading and is now carrying better than 20-ton traffic at higher speeds. This is only one of several bridges in similar situations where Federal and Army aid has been sought to permit rebuilding, but without avail. This bridge is a first-priority post-war project.

The Maintenance Engineer and the Bridge Engineer of the State Highway Board of Georgia work closely in planning the maintenance of the large number of wooden bridges. The bridge maintenance crews work out of the Division and Sub-Division offices of the Department and keep up a constant service to replace worn and damaged timbers. The restrictions in the use of soft-wood lumber have made it practically impossible for the state to use the better grades of longleaf, yellow pine, or red or black cypress, which are native to Georgia.

Crowned mats of hot or cold-mix double-penetration surfacing have been tried on the bridges to reduce vibration under heavy traffic and to hold the floor planks down, but the impact of the heavy trucks loosens the planks just the same. The floors are built of 4 x 8-inch timber on 4 x 14-inch joists with timber curb and rail.

The cypress bridges on U. S. 1 have outlasted the period of 10 years for which they were built, but there has been no cypress available for repairs for over 1½ years. The lives of many of the bridges have been mercifully lengthened by the reduced legal speeds of motor vehicles and the greatly increased use of "Slow" and "Narrow

(Concluded on page 46)

C. & E. M. Photo
A portable sawmill produces lumber for Georgia bridges.

State Buys Sawmill to Produce Enough Lumber To Maintain Group of Old Wood Bridges

✦ THE maintenance of wooden bridges in Division 5 of Georgia, the southeastern coastal area, is a real problem (see accompanying article). The scarcity of lumber, because of its increased use by the Army and Navy for buildings and for long trusses to replace steel, has raised the price to all purchasers. To overcome this situation, the State Highway Board of Georgia took advantage of the standing timber on land purchased for a clay-gravel pit in 1926 and which was worked out several years ago.

(Concluded on page 28)

Shortage of Treated Lumber Leads to Trial of Liquid Rosin As a Preservative by Georgia Highway Division 5

✦ IN order to overcome the shortage and high cost of creosoted lumber in Georgia, the State Highway Board has installed four open vats in Division 5, the southeastern coastal area, to treat timber with a liquid rosin. It is expected that the number of treatment points in the Division will soon be increased to six so that there will be one for each area for which a resident engineer is responsible.

Principle and Cost of Treatment

The principle of treatment with a wood preserver, liquid rosin now being used for lumber treatment in Division 5, is the replacing of the remaining moisture in the cells of air-dried lumber by a resinous substance which will prevent further entrance of moisture leading to the rotting of the lumber. The lumber to be treated is immersed in the wood preserver without heat for a period of 24 hours more or less, depending on the cross section of the wood. Where it has been desired to speed up the treatment of lumber and no vats were available at the location, four or five coats of the wood preserver have been applied to the lumber by hand with beneficial results.

An advantage of this type of treatment over creosote treatment is that after the rosin has dried in the pores or cells of the wood, it hardens the wood and it is possible to apply standard bridge paint over the treated lumber. This is particularly advantageous in the case of bridge posts and rails.

The cost of the treatment, based on the experience in Division 5 in Georgia thus far, is about $17.00 per MBM, divided into $15.00 for material and $2.00 for labor. The treatment of 1 MBM of lumber requires about 25 gallons of the wood preserver.

Preparation of Lumber

At present, only 4 x 8 to 6 x 8 lumber is being treated by this method in Division 5, with a few 10 x 12 pieces. For the larger-specification lumber, the State requires 75 to 80 per cent heart content which does not need treatment. Only caps and stringers for bridge repair are used without treatment.

At the treatment site visited on Georgia Route 38 at Ludowici, between Hinesville and Jesup, large racks have

(Concluded on page 29)

C. & E. M. Photo
A bundle of bridge timber being removed from the concrete treatment vat in Georgia Highway Division 5.

Paving Airport Runways

Over 1,000,000 Yards of Runway, Apron and Taxiway Paving by Same Contractor And Equipment at Maxwell

By THEODORE REED KENDALL,
Editor

✦ THE site near Montgomery, Ala., where experiments by Wilbur and Orville Wright were carried on to improve on their demonstration that heavier-than-air machines could fly, has recently become a four-engine flying school. When R. H. Wright & Son, paving contractor of Columbus, Ga., completed over 19,000 feet of tie-in taxiways, the U. S. Engineer Department wrote "Finis" to a job which has been under construction and expansion intermittently ever since April 18, 1918, when the first three months of construction resulted in an engine and repair depot. The name Maxwell Field was bestowed on the expanded post on November 8, 1922, and the present war saw further rapid expansion in all facilities. The original authorization under the present construction program for runways was for 522,700 square yards of paving, and this was more than doubled by later extensions.

The Wright contracting organization is known for its speed based on thoroughness of preparation, and its work at Maxwell Field was no exception. Its office was complete on the site in an old Western Union railway car which moves to the next job as a part of the freight train that hauls the equipment. At the front of the car is the office with a staff of four and in the rear is the parts department for the job. The car is equipped with telephone, running water, electric light, electric refrigerator, and Arcola steam heat.

Preparation for Paving

The ground preparations for this job were important. The paving itself consisted of pouring slabs 25 feet wide of 9-6-6-9-inch cross-section for 150-foot runways, 100-foot taxiways, and 400-foot aprons. The perimeter taxiways alone were the equivalent of over 19 miles of standard 20-foot pavement.

The soil in this area is an A-7 soil on river terraces. To stabilize this material to make it adequate as a base for the concrete slabs, material was hauled in from a sand-gravel pit on the field and mixed with the runway subgrade. The resulting mix has a clay content of about 30 per cent. This added material was spread over the surface, mixed with the base material by disks and power graders, then compacted by sheepsfoot rollers and finally by pneumatic rollers, with the addition of the proper amount of water for optimum moisture during the entire operation.

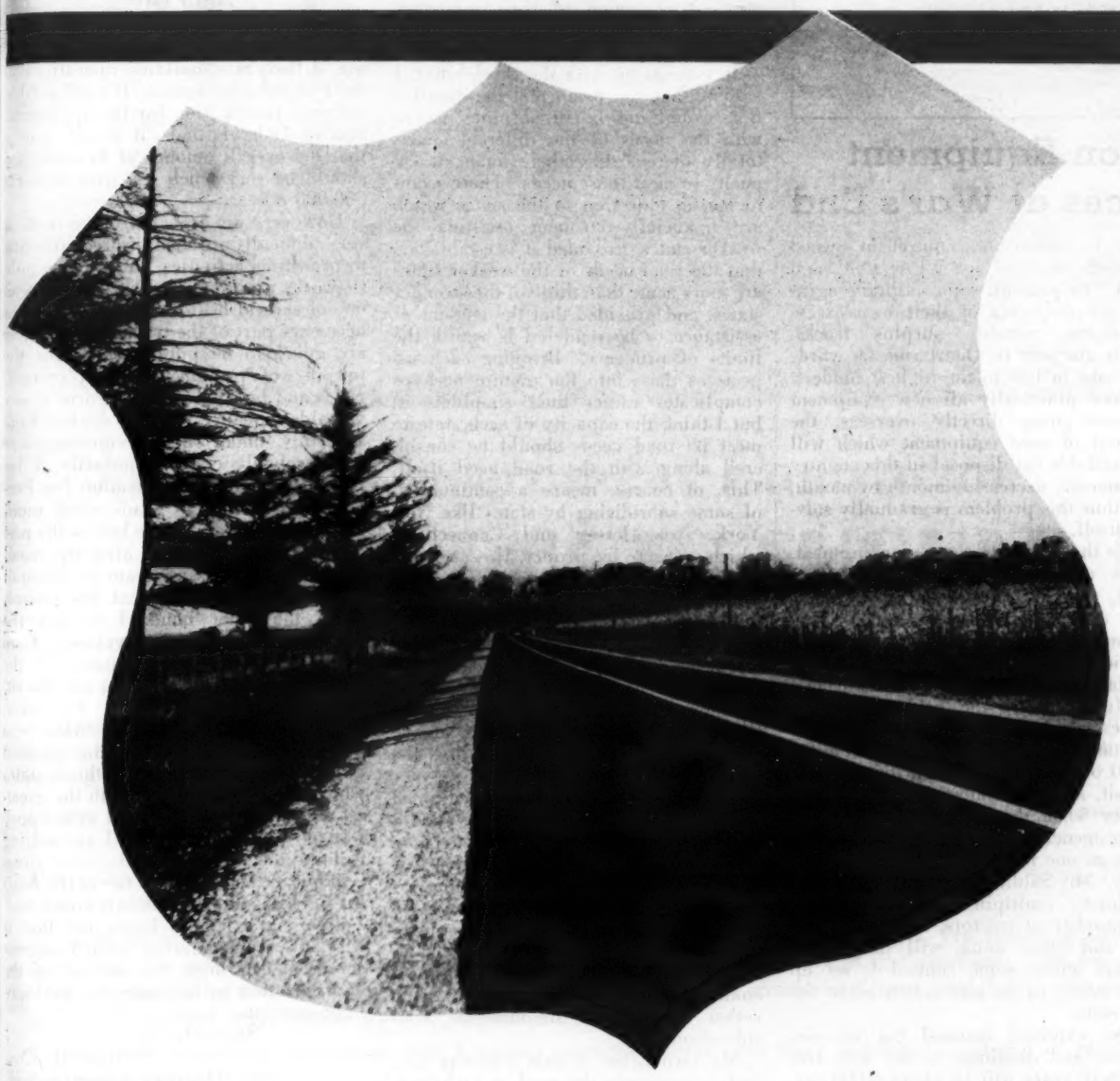
The Batching Layout

The four-unit batching outfit, set up on a siding of the Gulf, Mobile & Ohio RR, was well spread out to prevent interference of the various trucks. There were two batching plants for aggregate and two for cement. Inasmuch as there were concrete pavers of two sizes, a 27-E and a 34-E, the contractor considered it better to have a batching plant for each paver rather than shift the batch weights as the trucks arrived at a single plant. The reason for two bulk-cement batching plants was entirely different. The cement

(Continued on page 18)

The 34-E and 27-E Koehring pavers which poured over 1,000,000 square yards of runways, taxiways, and aprons at Maxwell Field.

10 *miles of smoother, safer driving for traffic on* U.S. #20



ILLINOIS U S 20

Resilient, heavy-duty Texaco Asphalt paving on 10 miles of U. S. No. 20 west of Elgin, Ill.

When traffic on U. S. Highway No. 20 rolls west out of Elgin, Ill., it strikes a new 10-mile stretch of Texaco Asphalt. This smooth, resilient pavement, constructed last September, is three inches thick. It was laid directly over a worn concrete pavement.

The new Texaco Asphalt construction on U. S. 20 is of the plant-mixed type, consisting of two courses, binder and wearing surface, each 1½ inches thick.

Mile after mile of plant-mixed Texaco Asphalt surface, laid over existing worn, rough pavements, have given upward of 20 years service with little upkeep.

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Edgar J. Buttenheim, President — Donald V. Buttenheim, General Manager
George S. Conover, Vice President — Herbert K. Saxe, Treasurer
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Disposal of Construction Equipment Owned by Armed Forces at War's End

Much thought is being given to the manner in which construction units of our armed forces will dispose of new and used construction equipment, as one after another of our fighting fronts is closed down by the unconditional surrender of the enemy. At the end of World War I, the construction-equipment market was glutted with used trucks and other equipment, much of which was turned over to highway departments. At the termination of World War II, which undoubtedly will end serially, we want an orderly disposition of such construction equipment as is still owned by our military construction units.

Equipment which will be in existence when V-Day comes will consist of the great volume of equipment in service overseas, used equipment still in this country, and new units on the assembly lines or en route from factories to shipping points for overseas service.

We have been assured by our military leaders that equipment already in use overseas will remain there, for the reconstruction of devastated areas, on some form of lend-lease. Thus that part of the great volume of construction equipment built for war purposes need cause no worry.

The used equipment owned by the armed forces in this country must be disposed of and not become a complete economic waste by being allowed to rust away in open yards. But it must be sold under conditions that will place it directly in the hands of construction and maintenance units of our highway departments and contractors—not in the clutches of junk-yard specialists who may resell such equipment, not properly reconditioned or serviced, below accepted used-equipment prices.

The most probable method of disposal will be through existing facilities, namely the Utilization Branch of the Treasury Procurement Division, which was created by executive order originally to redistribute equipment owned by such agencies as WPA, CCC and NYA. At present, some military agencies are disposing of their own excess equipment, notably surplus trucks, which are sent to Quartermaster yards and sold in lots to the highest bidders.

Since practically all new equipment is now going directly overseas, the amount of used equipment which will be available for disposal in this country is generally decreasing month by month, and thus this problem is gradually solving itself.

We then come to the new equipment, either on the assembly lines, in shipment, or in storage awaiting shipping orders for overseas service. This amounts to a considerable volume, according to Fred Salditt, Vice President of Harnischfeger Corp., who has made a careful study in the field of shovels, cranes and draglines. There is constantly, under present war orders, about 3,000 of these machines in distribution-transit, and this condition will exist no matter when the war ends, unless the using agencies reduce their orders gradually as one front or another ceases activity. Mr. Salditt feels that these 3,000 machines, multiplied many times by the number of tractors, scrapers, graders, and other units, will plague the market unless some control is set up now, ready to go into action when the war ends.

The expected demand for shovels, cranes, and draglines in the first two post-war years will be about 6,000 machines a year, double the 1939 annual production, but only 60 per cent of the expected 1944 production of 10,000 units. Thus there is no doubt that every construction project and every highway department can be fully equipped right off the assembly lines in the first two

(*Concluded on page* 20)

Cox Discusses Basis Of Allocating Funds Under Federal Aid

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY:

I am in complete agreement with three of the four major points you make in your editorial "Let's Simplify Federal-Aid Allocation" in the January issue of CONTRACTORS AND ENGINEERS MONTHLY. I concur that the proposed supplementary appropriation is not a suitable approach to a solution of the problem presented by the legislation in its present form, that Federal-state participation should be on a 50-50 basis, and that the apportionment to the states should be determined by their road needs after review of their published needs by the Public Roads Administration.

In connection with the third point, I assume that you mean that the distribution would not be in absolute accord with the needs of the different states, totally disregarding their financial capacity to meet those needs. There seems to me no objection to the states which are financially stronger assisting the weaker states, provided it is established that the road needs of the weaker states are more acute than those of the stronger states, and provided that the amount of assistance to be rendered is within the limits of prudence. Bringing such aspects as these into the picture perhaps complicates rather than simplifies it, but I think the capacity of each state to meet its road needs should be considered along with the road need itself. This, of course, means a continuation of some subsidizing by states like New York, New Jersey and Connecticut, which seems to me proper. However, the subsidy should be of reasonable amount and should be in accordance with actual needs. It is quite possible that some of the states which we have traditionally felt needed help have now been helped to a point where their highway systems are more adequate for the traffic on them than are the highway systems of the states which have been extending the help.

The first point made in your editorial is that the road needs of the state should be the sole determinant of the apportionment of funds. It seems to me that this point cannot be considered without, at the same time, giving some thought to the justification for *any* Federal appropriation for highways, or at least for an appropriation of the size which is now contemplated. This point involves some rather broad and fundamental considerations.

My own belief is that highway use, and consequently the need of highways, is so preponderantly local that the states are acting with very little justification in attempting to shift the financing of their road-building operations to the Federal government. If road need is the only justification for the appropriation of Federal funds, it would appear that the overall amount of Federal Aid should be very much less than $1,000,000,000 a year.

"I used to do the same thing with our family car!"

However, we are confronted with a very difficult problem in reconversion to peacetime activities, and a large public-works program (and by large I mean one of several billion dollars) will be a necessary part of the transition. If there are going to be public works for the purpose of preventing unemployment, roads and bridges certainly form a very valuable category of such works. Consequently, under such circumstances as will probably exist temporarily, I believe that there is justification for Federal contribution to roads on a much larger scale than we have had in the past or than we should have after the needs of a public-works program to forestall or alleviate unemployment has passed.

On the other hand, I respect the judgment of such men as yourself, Congressman Wolcott, and many of the highway officials who do not see the situation in this light at all. Moreover, the distinction appears somewhat academic, as the states with the greatest road needs are apparently those states which will be confronted with the greatest danger of unemployment in the post-war period. Consequently I am willing to leave the whole unemployment situation out of the picture as far as the *basis* for the allocation of funds is concerned. I do think it should have, and that it will have, consideration when Congress comes to determine the *amount* of the appropriation to be made for highway improvements.

Sincerely yours,
William J. Cox
State Highway Commissioner,
Connecticut State Highway Department.

The gentler sex takes over erosion control in Indiana. Left, a close-up of the crew with Charles Taylor, foreman; center, mulching on flat ground; right, the crew works just as well placing mulch on slopes. See page 35.

Said One Government Contractor . . .

"THAT PHOTO SHOULD HAVE A $10,000 GOLD FRAME!"

A sudden rain on a 4 inch gravel-emulsion base course at a military airfield, raised the moisture excessively. This occurred before compaction could be started, and therefore drying was essential before rolling could proceed.

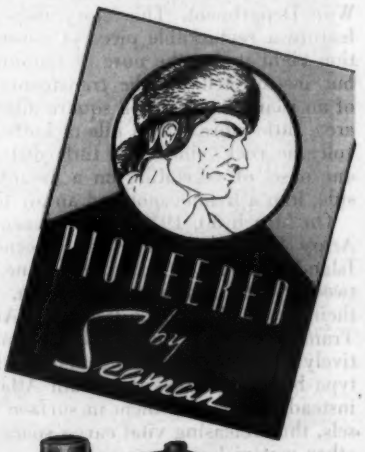
To dry the material by any of the usual methods would have cost at least $10,000.00 in man-power and equipment. And just as important was the element of time.

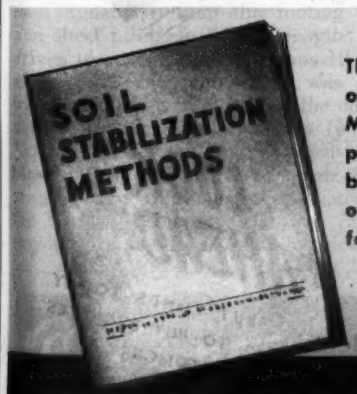
The answer was a wire to Seaman Motors. That night a SEAMAN MIXER was on its way. The next day the SEAMAN was on the job.

Up and down the runways the SEAMAN stormed along. With its hood raised, the spinning tines gathered the wet aggregate and threw the material in a long arc behind the machine. This aeration proved to be the answer, for, — in the first pass alone, excess moisture had been reduced 50%. A second pass made the aggregate acceptable.

In the next operation, the hood was lowered and the coarse and fines re-mixed in-place, — ready for compaction.

The average total production for the three passes to aerate and complete the gravel emulsion base course was 1800 square yards per hour.





The new, 1944 edition of "Soil Stabilization Methods" is just off the press. A request will bring your copy, — without obligation. Just ask for Bulletin E-22.

SEAMAN MOTORS
MILWAUKEE
WISCONSIN

SEAMAN PULVI MIXER

Cutting a medium-size tree close to the ground with a Davey pneumatic saw.

Clearing Big Trees At Mosquito Creek

Work has been in progress for a little over three months at Mosquito Creek Dam which will create a reservoir 14 miles long and 2 miles wide to provide water for the big steel mills of Warren and Youngstown, Ohio. Most of the work that has been done thus far has been the cutting of about 1,500 acres of trees.

J. E. Martin, General Superintendent for D. D. Mullett Co., of Pittsburgh, Pa., reports that as many as twelve trees from 7 to 15 inches in diameter have been cut in 10 minutes, total elapsed time, by a Davey pneumatic saw. One 14-inch elm tree was sawed through in just 40 seconds. The use of the pneumatic saw has resulted in savings in man-power, time and money on this job which involves tree felling, log-cutting and bucking, piling preparation and bulkheading.

Atlantic Pinpoint Now Serves Planes

Another of those "now it can be told" stories has just been released by the War Department. This story does not feature a remarkable piece of construction right under the nose of the enemy but instead tells of the transformation of an island less than 38 square miles in area, little more than a pile of knife-like volcanic rock, cinders, a little dirt and one oasis of vegetation on a mountainside, into a livable spot and an air base.

On March 30, 1942, a detachment of Army Engineers landed on Ascension Island, a mere speck on the route between South America and Africa, and their work has permitted the Army Transport Command to fly comparatively short-range fighters and smaller-type bombers across the South Atlantic instead of shipping them in surface vessels, thus releasing vital cargo space for other matériel.

Rising less than 300 feet above the surface of the South Atlantic, except for the single mountain, Ascension boasted but two roads when the Americans joined the island populace of about 150 persons. During the time it took the Engineers to blast a runway for Wideawake Field out of the volcanic mountainside, they lived a lonely life. Facilities for recreation were rare, and so that attention would not be called to the project, only the most essential shipping was permitted near the island. In three months the runway was ready.

There were some problems in the creation of this firmly anchored airdrome in the middle of the 3,000-mile air route, but the problems centered around not enemy planes or U-boats, but birds. Hundreds of thousands of sooty terns, or wideawakes, from which the airfield takes its name, persisted in nesting at the end of the runway, creating obvious hazards to aircraft operations. Cats were imported to rid the island of the terns, but the cats themselves were devoured by boobie birds, a larger species. Finally, an expert on birds concluded that the only way to persuade the winged pests to move their habitat was to take away their eggs, which are edible, as many a soldier stationed on Ascension will testify. Toward this end chicken wire was stretched over some of the larger nesting spots and it has worked fairly well.

Most of the island's shortcomings, except for the constant clouds of volcanic dust which sweep across it, have been overcome. Frame buildings have arisen to supplement tents. Roads have been built, and while the formation of the island makes smooth riding an impossibility—one of the roads is referred to as "Hell's Boulevard"—they at least provide access to all important points of the islet.

Dual-Valve Features New Paving Breaker

The dual-valve construction which is a feature of the new Sullivan paving breaker is designed to cushion the stroke at both ends of the piston and to measure sparingly the air for each powerful forward stroke and fast return stroke. The dual valve is end-seating for long life and efficient action under any conditions, the manufacturer states.

This new K-81 paving breaker, the first in which the dual valve is used, has a self-lubricating reversible long-stroke piston, replaceable chuck bushing, easy grip handles, U-type side rods for sturdy construction, accurate alignment, and operator comfort. A cam-type steel retainer holds the steel securely and is easy to manipulate. The tool weighs 81 pounds and is 29 inches long.

Further information is contained in Bulletin 87-N, copies of which may be secured on request direct from the Sullivan Machinery Co., Michigan City, Ind., by mentioning this item.

with Buckeye CABLE control

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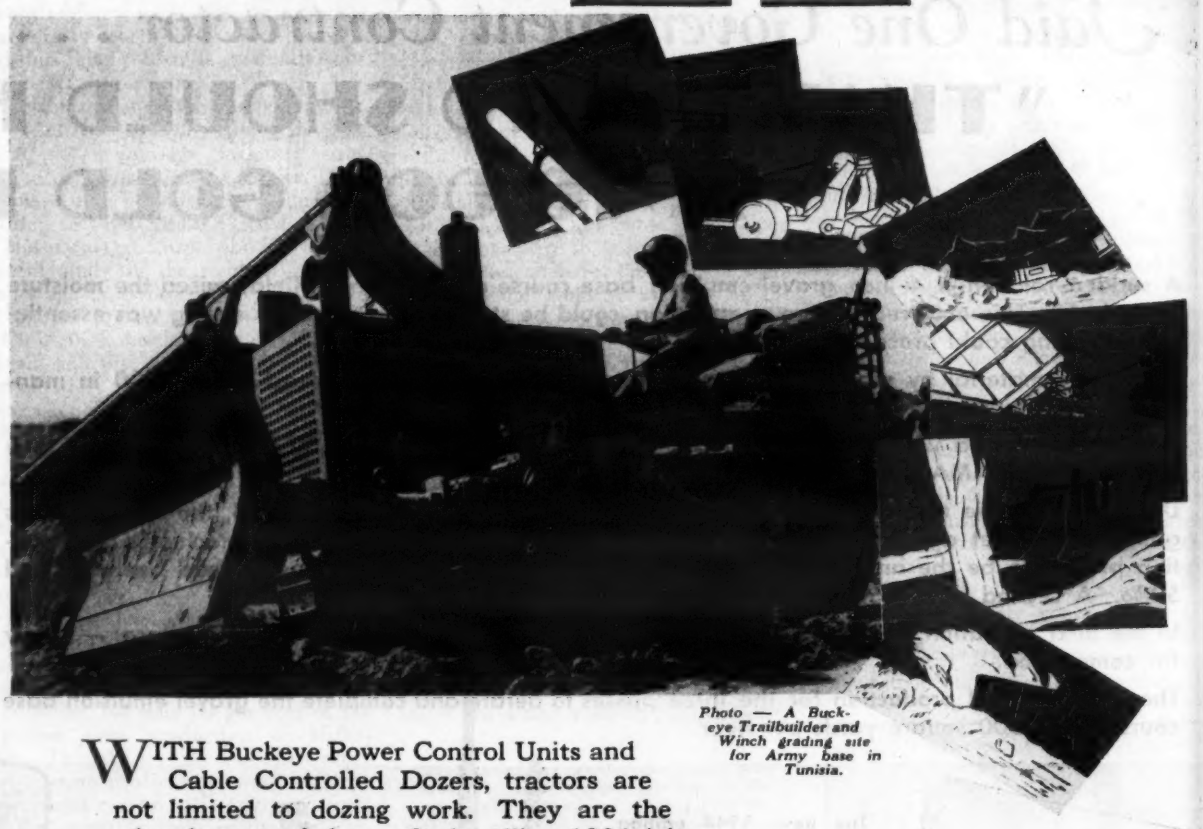

Photo — A Buckeye Trailbuilder and Winch grading site for Army base in Tunisia.

WITH Buckeye Power Control Units and Cable Controlled Dozers, tractors are not limited to dozing work. They are the handy men of the outfit, handling 1001 jobs on fronts all over the world.

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Double-Leaf Bascule Spans Jewfish Creek

Bridge Forming Vital Part Of Key West Highway Built By East Florida Contractor; Has Unusual A-Frame Bents

(*Photos on page 72*)

✦ TO provide for marine traffic on the Florida Inland Waterway from Jacksonville to Key West, the Jewfish Creek Bridge on the Florida City-Key West Overseas Highway was designed as a double-leaf bascule by the Florida State Road Department and was built during 1942-43 by Cleary Brothers Construction Co. of West Palm Beach.

The main bascule span consists of two leaves with a distance of 118.5 feet between trunnion centers; the counterweight tail structures are approximately 18 feet long so that the movable portion of the deck is 154 feet in length. Two 35-foot approach spans of reinforced-concrete deck-girder construction complete the structure. In order to reduce the use of steel, a critical material, the main span was floored with treated timber, but the steel structure is so designed that the floor can be replaced with 5-inch I-Beam-Lok open steel flooring, as originally planned, when deemed advisable. Serious delays in obtaining materials were encountered by the contractor, with a resulting over-run in contract time.

Materials

Treated-timber piles and flooring were furnished by the Miami Wood Treating Co. and trucked to the bridge site. Sand, originating at Lake Wales, was shipped by rail to South Miami and delivered to the job by truck. The coarse aggregate was furnished by the Naranja Rock Co. and trucked to the job from its plant at Homestead. Cement in cloth sacks from the Tampa plant of the Florida Portland Cement Co. was shipped by rail to South Miami and trucked to the point of use.

Both structural and reinforcing steel were furnished by the Virginia Steel Co. The structural steel was shipped by rail to Port Everglades at Fort Lauderdale and barged to the bridge site via the Florida Inland Waterway. Reinforcing steel was shipped by rail to South Miami and trucked to the job. Fresh water, obtained from the Florida City-Key West pipe line, was used in mixing concrete.

Bascule Piers

Bethlehem steel sheet piling was driven, using swinging leads and a 3,000-pound drop hammer handled by a Northwest crane mounted on the bank, to form a cofferdam 19 inches larger in each dimension than the footing size. The sheet piling in 24-foot lengths was driven to an elevation of minus 18 feet, after which the same crane was used with a clamshell to clean out the cofferdam to an elevation of minus 16 feet. The site of the dam had previously been blasted and dug nearly to grade by a crane with a dragline bucket located on the bank. A concrete seal was placed through tremies to an average thickness of 6½ feet. After the seal had attained sufficient strength, the cofferdam was unwatered and the pier footings poured "in the dry".

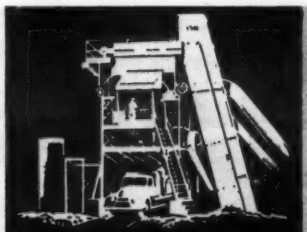
The bascule piers, rather complicated structures housing the operating machinery for the movable spans, were formed and poured, using forms lined with plywood for all exposed surfaces. Most of the concrete in the piers was delivered from the mixer to the forms by a 1-cubic yard steel-bottom dump bucket handled by a crane on the bank. The mixer was a 1-cubic yard Rex fed by six 2-batch trucks. The trucks received their batches at Blaw-Knox bins through weighing batchers. A small Northwest crane was used to feed the batching plant.

The structural steel forming the bascule leaves was erected by a steam-powered stiffleg derrick built on a floating barge. An interesting problem developed in trying to insert the trunnion shafts, 16 inches in diameter and 8 feet long, into the steel collar bolted to the main trunnion girders. They had been machined to a tolerance of 1/1,000 inch

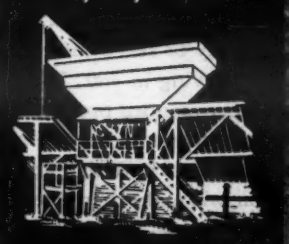
(*Concluded on page 48*)

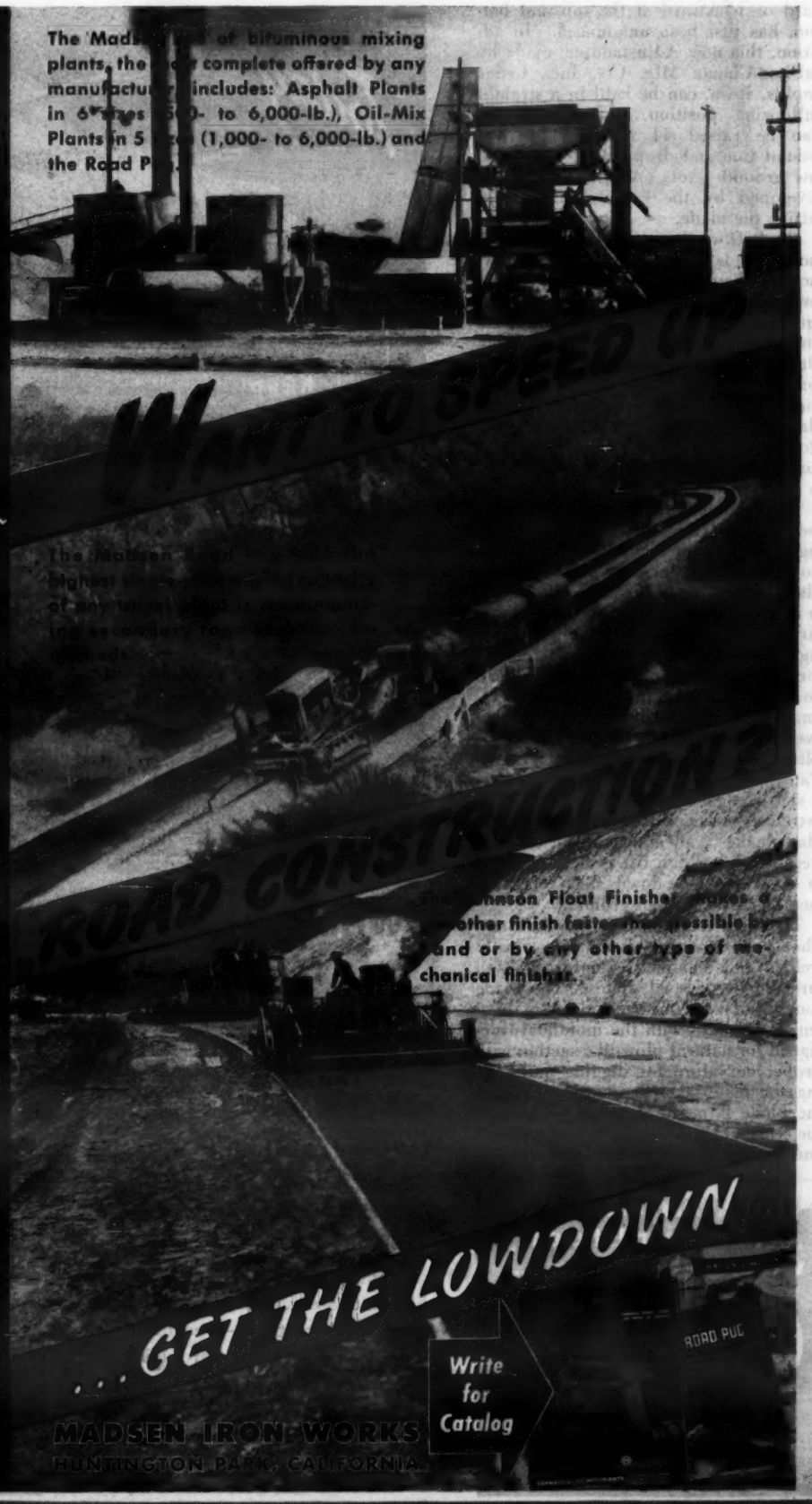
A plate girder for Jewfish Creek Bridge delivered at the site by a derrick barge. Note the trunnion-pin bearing in the foreground.

Carey Elastite EXPANSION JOINT
Standard in Concrete Construction for 31 Years
ECONOMICAL and EFFICIENT
Asphalt Joint
Fiber Joint
Sub-Grade Felt
THE PHILIP CAREY MFG. CO.
Dependable Products Since 1873
LOCKLAND, CINCINNATI, OHIO


ASPHALT PLANTS
Cap.—125 tons per hr. Record reported—2414 in 12 hrs. (201 tons per hr.) Marine Base at El Toro, Calif. by Lewis Cons. Co.

ROAD PUGS
Cap.—200 to 550 tons per hr. Record reported—7920 tons in 20 hrs. (396 tons per hr.) Phoenix Cons. Co.

CEMENT FINISHERS
Cap.—300 lin. ft. per hr. Record reported—3065 lin. ft. in 8-hr. (383 ft. per hr.) Albany, Ore. by Roy Houck.

AGGREGATE BATCHERS

ROLL-TAMP COMPACTORS

The Madsen line of bituminous mixing plants, the most complete offered by any manufacturer, includes: Asphalt Plants in 6 sizes (500- to 6,000-lb.), Oil-Mix Plants in 5 sizes (1,000- to 6,000-lb.) and the Road Pug.
ROAD CONSTRUCTION
Madsen Float Finisher makes a smoother finish faster than possible by hand or by any other type of mechanical finisher.
...GET THE LOWDOWN
Write for Catalog
MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

The new Adjustadozer recently announced by LaPlant-Choate.

A Tilting Bulldozer For Post-War Work

A new type of bulldozer designed so that the blade may be tilted in four positions, 16 inches up or down at either end of the blade and 3¼ inches forward or backward at the top and bottom, has just been announced. In addition, this new Adjustadozer, made by LaPlant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, can be held in a straight bulldozing position. The blade can also be raised 44 inches above the ground line and dropped 72 inches below ground level. A powerful lift is developed by the cable operation in raising the blade.

The backward and forward tilting of the blade is done by a simple screw-jack mechanism operated by a rachet lever. This adjusting mechanism is equipped with gages which indicate when the blade is level, at its maximum tilt down at either end, and when tilted forward or backward. These simplify and remove all guesswork in setting the blade and make it possible for the operator to adjust one side of the machine completely before going to the other side to make a final adjustment.

The various blade positions enable the Adjustadozer to be used for opening shallow V ditches and doing hillside work, while the forward and backward tilt make it possible to work effectively in different kinds of material from loose dirt to rock. This tilt is also advantageous in leveling. By tilting the top forward, for example, the machine can do a better job of leveling, as the cutting edge will not dig in but is pushed over the loose earth. When the top is tilted backward, the cutting edge penetrates very hard material and presents a sharp edge to any obstruction. The extremely high lift and drop of the blade makes it advantageous for clearing trees, where a high lift is required, and to control loads down steep embankments or over uneven ground.

The main frame of this new LaPlant-Choate bulldozer is heavy electrically welded box channels, reinforced with large box-type steel plates. The blade consists of welded boxed plates of high tensile strength with the moldboard designed for natural plow-like suction with proper curvature for digging and rolling the material. The cutting edge of the blade is made of three pieces with the center section reversible and the end sections hard-surfaced and replaceable. The unit is designed for mounting on a Caterpillar D7 tractor.

Complete information on the placing of orders for this new bulldozer and its availability for post-war work may be secured direct from the manufacturer.

Rubber Problem Will Be Critical in 1944

Despite greater supplies of synthetic rubber as a result of the government plant construction program nearing completion, this nation enters 1944 with its rubber dilemma still acute, according to Dr. R. P. Dinsmore, Vice President in charge of research and development of the Goodyear Tire & Rubber Co., Akron, Ohio.

Dr. Dinsmore warned that the present problem of converting every possible rubber article to the synthetic rubber process "must be attacked under adverse conditions". One of these conditions is the fact that the nation's natural rubber stockpile is diminishing fast; another is the necessity to make the conversions and at the same time to improve the products of the nation's new synthetic-rubber plants.

Admitting that the synthetic-rubber plants erected for the war emergency are "far from the last word", Dr. Dinsmore pointed out that there are still many deficiencies in synthetic rubber, particularly for high-speed truck and bus tires. This is due to synthetic rubber's greater susceptibility to heat, and also to the inadequate supply of rayon. The practical solution of the high-speed truck-tire problem seems to be to use enough crude rubber to make passable tires until the supply of rayon permits elimination or adequate reductions in the use of crude, while improvements in compounding and tire construction should also help, Dr. Dinsmore said.

He suggested that during 1944 both private and government planning give first preference to rubber improvement and secondary attention to the economics of plant process. "Upon this decision rests the question of whether the splendid job already done shall be made effective or of doubtful value. As far as rubber is concerned, whether viewed from a patriotic or a selfish competitive standpoint, no disaster could exceed the failure to solve this problem and no other success could outweigh its solution," Dr. Dinsmore concluded.

WHEN THERE'S WORK TO BE DONE —IN WAR OR PEACE

YOU will find GM Diesels hard at work in every theater of the war. They power massive tanks moving into battle, heavy trucks in endless supply lines, tractors to clear landing fields, landing and assault boats, big submarines and fast subchasers in home and in foreign waters.

In every respect, these GM Diesel Engines are living up to all that was predicted for them—and more. In many instances they are doing an even greater variety of jobs than they were designed for. They are standing up under conditions that couldn't possibly have been foreseen.

When the war is over, GM Diesels will be ready to serve the peace as they are serving in war. With this difference: expanded production facilities, together with improvements and refinements in design and construction, will make them even more available for use—more capable of reliable, low-cost performance.

GM Diesels will be on hand to show that they can do an even bigger job in America's trucks. Simple in mechanical construction; sturdily and precisely built; economical in operation and upkeep, GM Diesels will prove as indispensable in peace as they are proving vital in war.

GM DIESEL POWER

ENGINES...15 to 250 H.P., DETROIT DIESEL ENGINE DIVISION, Detroit, Mich.

ENGINES...150 to 2000 H.P. ...CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

STOP WINTER DELAYS
Get Summer Efficiency with
Aeroil
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Salamanders
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ALSO
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Emulsion Distributors — Power Sprays — Weed Burners
Lead Melting Furnaces — Torches and Burners
AEROIL BURNER CO., Inc.
WEST NEW YORK, NEW JERSEY

County Access Roads To Serve War Plants

Oklahoma County Completes Gravel Base with Concrete Curbs and Rock Asphalt Top; Connects Major Roads

By O. D. HALL

✦ A $1,250,000 county access-highway system to insure smooth uninterrupted flow of traffic between Oklahoma City, Okla., and large war plants southeast of the city was 90 per cent completed by Oklahoma County on November 1, 1943. Some asphalt surfacing on access roads leading to two nearby airfields will be completed early this spring.

All roads improved by the county bond issue, voted by the people of Oklahoma County on April 14, 1942, are topped with rock asphalt on a gravel base laid between concrete curbs. The standard width is 22 feet, including the curbs, except on East Reno and East Ash Avenues, which are 23 feet wide.

The new county access roads east and southeast of the city connect with four-lane concrete access highways which were financed entirely by Federal funds. For months prior to the opening of the Southeast 29th Street four-lane concrete highway, East Reno Avenue was the only hard-surfaced road from the city to the war plants. Alternate routes were one oil-topped and a rough dirt grade. The result was that during wet weather, which was quite prevalent during the autumn of 1942 and the winter and spring of 1943, approximately 23,000 people, most of them war workers, found it necessary to travel daily over the East Reno road. In addition, large fleets of construction equipment and trucks moved almost continuously over the old pavement to and from the war plants, which were still under construction.

The original East Reno Avenue pavement had been considered adequate to meet the purposes for which it was laid several years ago when the Oklahoma City oil fields were discovered in that area, but it was unable to withstand the constant heavy pounding imposed by war conditions. County road repair gangs worked desperately to keep the old road in condition by filling holes and cracks with gravel and asphalt, but heavy traffic seriously handicapped their efforts. They steadily lost ground until the outside edges of the roadway became so ragged and rough that at times motor vehicles could not pass on the pavement and serious traffic jams resulted. Finally traffic officers had to route cars only one way during peak hours conforming to work shifts at the war plants.

New Concrete Curb

The first step in the construction of the new East Reno road was the placing of 12 miles of concrete curbing, 6 miles along each side of the old 18-foot asphalt highway. Ten miles of this construction was at the outer edges of the 5 miles of old asphalt surface, and 2 miles of the curbing was laid along a 1-mile stretch of East Reno Avenue which had not previously been paved, but which was old dirt grade. The rough grading on this 1-mile section had been done about three years ago by the county with WPA aid.

Lewis & Co., of Muskogee and Oklahoma City, Okla., was awarded the contract for placing the curbs on East Reno Avenue. The contract price was 87 cents per linear foot for the first 5 miles and 94 cents for the additional mile at the east end of the road. The higher price was fixed because of the longer haul of materials. The job was completed in June, 1943, within the 30-day contract period.

The concrete curbing or edging is 30 inches wide, 7 inches thick at the pavement and 10 inches thick at the outside.

The 12-foot Jaeger spreader in operation, laying a 9-foot strip of asphalt, and pulling a spike-tooth harrow to break up the lumps.

It was laid to be flush with the asphalt pavement and slopes ¾ inch in its 30-inch width. The new asphalt surface is 18 feet wide, the same as the old pavement, but with the widths of the curbs added, will make the road 23 feet wide.

The contractor cut from 6 to 8 inches into the edges of the old pavement with a motor grader to make the curb trench

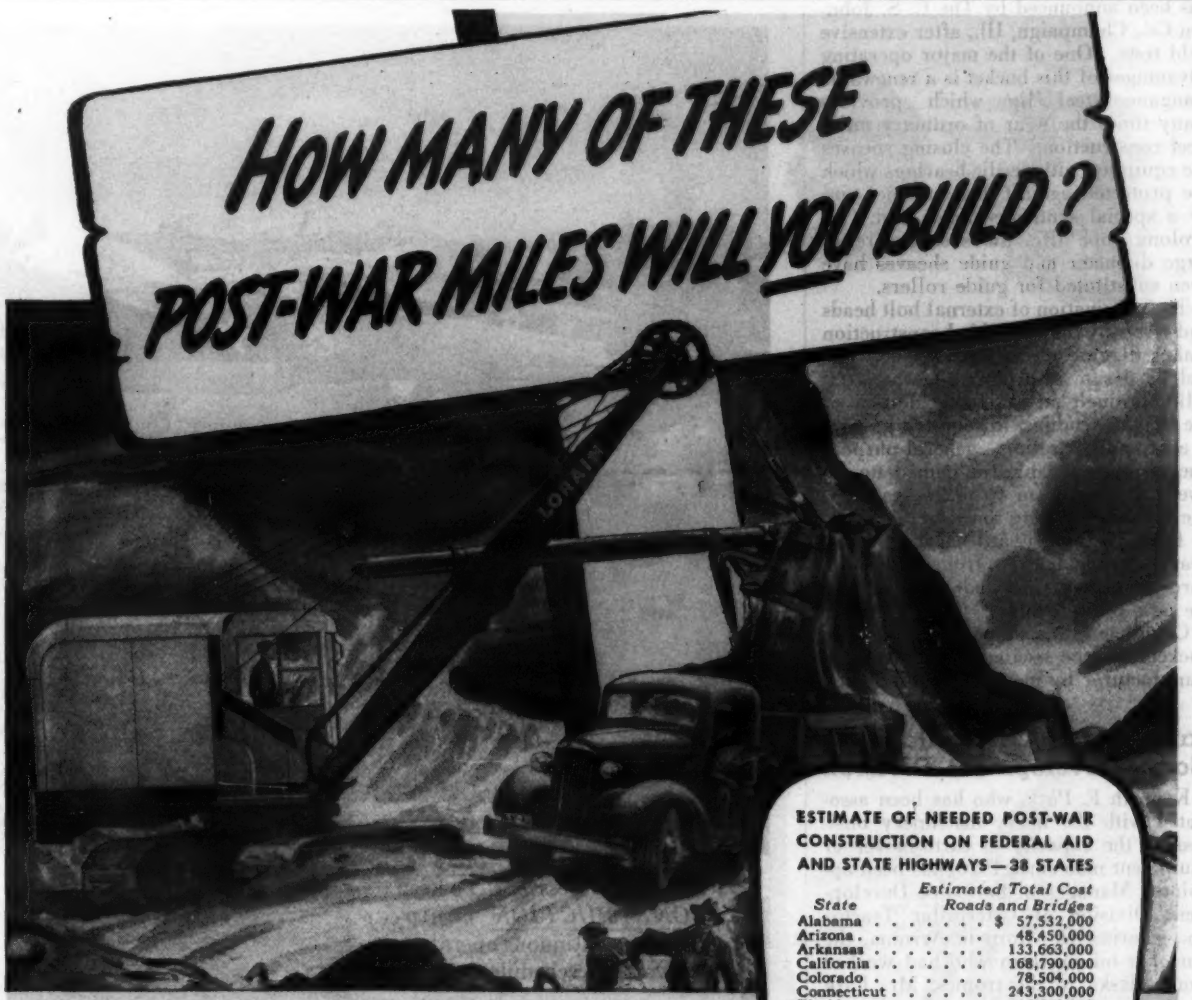
(*Concluded on page 24*)

SAND'S Aluminum Line & Surface LEVEL

Endorsed and Adopted by Road Builders and Contractors

Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.

SAND'S LEVEL & TOOL CO.
8531 Gratiot Ave. Detroit 13, Mich.



The answer is right in your own hands

THE number of post-war miles you'll build depends largely on how well you do two things *right now!* **First**—talk up the need and advantages of prompt action on post-war highway construction programs among influential members of the communities you cover. **Second**—plan an organization and equipment set-up that assures you a competitive advantage when these jobs open up and bidding starts. Let your Lorain distributor act as right-hand man when planning your post-war equipment. He'll give you the last-minute information on the type of equipment needed to handle jobs scheduled for your area on the most efficient, economical basis. If you haven't done so already, start things moving by getting in touch with your nearest Lorain distributor today.

THE THEW SHOVEL COMPANY • LORAIN, OHIO

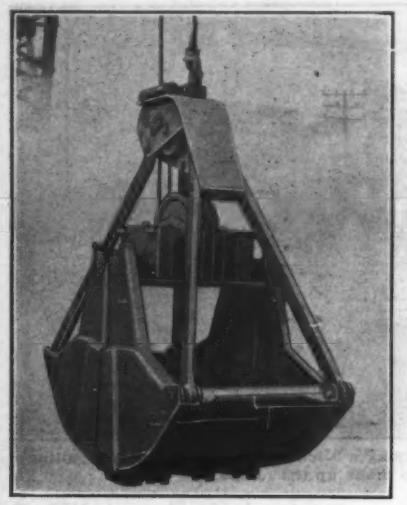
ESTIMATE OF NEEDED POST-WAR CONSTRUCTION ON FEDERAL AID AND STATE HIGHWAYS—38 STATES

State	Estimated Total Cost Roads and Bridges
Alabama	$ 57,532,000
Arizona	48,450,000
Arkansas	133,663,000
California	168,790,000
Colorado	78,504,000
Connecticut	243,300,000
Florida	115,843,000
Georgia	92,928,000
Idaho	23,760,000
Illinois	183,155,000
Indiana	160,861,000
Iowa	182,420,000
Kentucky	75,522,046
Louisiana	148,000,000
Maryland	86,146,000
Massachusetts	121,000,000
Michigan	340,009,000
Mississippi	77,278,500
Missouri	41,384,000
Nebraska	66,450,000
Nevada	38,049,370
New Jersey	193,590,000
New York	540,000,000
North Carolina	75,700,000
Ohio	580,000,000
Oklahoma	135,000,000
Oregon	150,000,000
Pennsylvania	449,768,000
Rhode Island	16,280,000
South Carolina	57,500,000
Tennessee	150,000,000
Texas	830,000,000
Utah	54,100,000
Virginia	110,753,000
Washington	65,200,000
West Virginia	179,300,000
Wisconsin	153,000,000
Wyoming	16,500,000
Totals	$6,215,975,916

(Figures Prepared by American Association of State Highway Officials)

thew Lorain SHOVELS

CRANES • DRAGLINES • MOTO-CRANES



The new C. S. Johnson clamshell.

An All-Welded Bucket For Faster Digging

A new all-welded clamshell bucket has been announced by The C. S. Johnson Co., Champaign, Ill., after extensive field tests. One of the major operating advantages of this bucket is a renewable manganese-steel lip which provides many times the wear of ordinary mild-steel construction. The closing sheaves are equipped with needle bearings which are protected against dirt and moisture by a special synthetic-rubber seal. To prolong rope life, the sheaves are of large diameter and guide sheaves have been substituted for guide rollers.

The elimination of external bolt heads and rivets by the all-welded construction makes digging easier and faster. The welded design also permits greater stability through an exact distribution of the weight. Subject to required government authorization, general-purpose buckets are available for immediate delivery in sizes from ½ to 2½-yard capacity. Rehandling buckets available in from ½ to 2½-yard capacities, and heavy digging buckets from ½ to 1½-yard capacities are standard models in the new Johnson line.

Complete information regarding these buckets may be secured direct from the manufacturer by mentioning this item.

Park Heads Caterpillar Sales Development Division

Kenneth F. Park, who has been associated with the heavy machinery business in the capacity of earth-mover or equipment man since 1926, has been appointed Manager of the Sales Development Division of Caterpillar Tractor Co., Peoria, Ill. Born in Arizona, the son of a mining man who had worked from Alaska to the tropics, Mr. Park grew up in an atmosphere of rock handling and earth-moving. His own work as a civil engineer has included survey work for several Canadian railways, the town site of Anchorage, Alaska, and Mt. McKinley National Park, also in Alaska. After the World War, during which he was connected with the shipyards in Seattle, he spent seven years in selling and advertising and in 1926 returned to the earth-moving field, supervising the construction of extensive irrigation projects, levees, and protective embankments on the Pacific Coast.

Several years as superintendent and engineer on other important highway and flood protective projects followed. In 1933 he joined the R. G. LeTourneau organization as Advertising and Sales Promotion Manager, later becoming Chief Field Engineer, which position he held until his resignation to join Caterpillar.

Maine's Future Road Work

At the recent quarterly meeting of the Maine Good Roads Association, Russell McCleery, representing the Highway Users Conference, stated that Maine needs $35,000,000 for after-war highway work and emphasized the fact that 72 per cent of Maine roads are still unimproved. J. Fred O'Connell, of Bangor, Legislative Representative of the Maine Good Roads Association, pointed out that there are 24,000 to 25,000 miles of highways in Maine "being stove up" by heavy truck traffic during the war period and that 150 Maine bridges need rebuilding and 250 need repairing.

It looks as though there would be plenty of post-war highway work in Maine, which votes in September, 1944, on its Constitutional Amendment to prevent the diversion of highway funds.

State Asphalt Conference Will Be Held in Illinois

With the cooperation of the Illinois Division of Highways, the Asphalt Institute is sponsoring the speaking program of a State Asphalt Conference to be held in Springfield, Ill., February 23 and 24. This Conference, the first of its kind, is for the purpose of discussing with state, county, city and other highways officials the use of asphalt, not only under wartime conditions but in the post-war period when public works are going to be required to absorb a considerable amount of the man-power released from war work.

The Conference program, after the opening keynote addresses by Walter A. Rosenfield, Director of the Illinois Department of Public Works and Wesley W. Polk, Chief Highway Engineer of the Division of Highways, will be devoted entirely to an open-forum discussion of asphalt's uses, primarily in Illinois.

All groups which are directly or indirectly interested in the asphalt industry are represented on the general committee making the arrangements for the conference, which includes the following: H. B. Pullar, Vice President of the Asphalt Institute in charge of its activities in the Chicago area, Chairman; D. R. Donlen of The Texas Co., representing asphalt producers; Donald White of White Consolidated, Inc., representing contractors; Howard Bridges of Bitucote Products Co., representing emulsion manufacturers; H. A. Barber of Barber-Greene Co., representing equipment manufacturers; H. L. McKay of Great Lakes Asphalt & Petroleum Co., representing material supply men; H. W. Skidmore of the Chicago Testing Laboratory, representing testing laboratories; G. J. Berkley of Skokie Valley Asphalt Co., and Secretary, Black Top Roads Association, representing asphalt applicators and distributors; and H. Krause of Columbia Quarry Co., representing aggregate producers.

New Goodrich Manager

Edward H. Fitch has been named Merchandise Manager of the combined Automotive, Aviation and Government Sales Divisions of the B. F. Goodrich Co., Akron, Ohio. Mr. Fitch joined the Goodrich organization in 1931 and has served with his present division on special assignments and as Divisions Operations Manager since May, 1942.

Official U. S. Army Signal Corps Photograph

AIR ALERT *over there* relies on alertness *here!* To keep *CONSTRUCTION* equipment in continuous operation on wartime schedules use . . .

SINCLAIR PENNSYLVANIA and OPALINE MOTOR OILS, specialized gear oils and greases. These lubricants give *safe* lubrication under all loads and speeds . . . prevent avoidable shut-downs . . . reduce repair and replacement costs.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Large Sewer Placed In Cramped Location

Deep Cuts and Encroaching Houses Impede Excavation And Placing of Concrete For San Francisco Sewer

✦ THE inadequacy of a combined sewer, built in 1912 to serve a sparsely settled area in San Francisco, Calif., had become so acute by 1943 that permission for its immediate replacement was granted by the WPB. Although the annual rainfall in San Francisco is not great, it is likely to be concentrated and storms in which from ½ to 1 inch of rain falls are not unusual. The sewer constructed in 1912 was adequate to serve the needs of the Ingleside district at that time but extensive development in the succeeding years, with its attendant increase in impervious surface areas, had so increased the run-off that construction of relief facilities became imperative. Accordingly, the San Francisco Department of Public Works awarded a contract to Martin Murphy of Albany, Calif., who executed the job in a workmanlike manner despite its inherent difficulties.

Excavation

Construction of the improvement was complicated by the very limited right-of-way available. On certain sections there was only enough room between lines of brick and stucco residences for the necessary excavation, with the trench sheeting being driven as closely as possible to the footings of the houses. Trench depths as great as 26 feet added to the difficulties.

At the point where the improvement crosses Junipero Serra Boulevard, the 8-inch concrete road base, laid in 1928 under rigid control, was so hard as to cause considerable delay in its removal. Ingersoll-Rand and Cleveland pavement breakers, using air from a 300-cubic-foot Worthington compressor, did the job. Another difficult concrete-breaking job handled by the same equipment was the removal of the old 3-foot x 4-foot 6-inch concrete sewer which proved to be in perfect condition after 30 years of service. The presence of a 54-inch steel water line and a conduit carrying 11,000 volts of electricity did not lessen the contractor's troubles but these were crossed in a location less cramped than some other portions of the job and occasioned no incident.

The material excavated was a closely packed but, fortunately, dry sand. In the most cramped locations, where it was impossible for any machine to load the excavated material into trucks and where there was insufficient side clearance for storage of the excavated material along the trench, an ingenious method was used. A Universal truck crane with a ½-cubic-yard Williams dragline bucket was spotted at the end of the section. An Ingersoll-Rand single-drum air hoist was anchored at the other end of the section, approximately 250 feet away, and a line from this hoist was attached to the dragline bucket to pull it into the area from which the dirt was to be removed. Dirt was dragged to the crane, stockpiled, and later loaded into Ford and Chevrolet trucks and hauled away.

Because of the close quarters, the excavated material had to be handled in various ways. Part of it was stockpiled near one end of the job where there was room for storage. Some of it was hauled to completed portions of the sewer and used for backfilling immediately by being dumped as close as possible to where it was needed and pushed into final position by an Allis-Chalmers Model M tractor with a Hough hydraulic shovel. The topsoil had to be stockpiled and later used to top the backfill where there was to be replanting. Backfill material was settled by jetting with water from the local distribution system.

A 1½-inch-diameter pipe line with frequent outlets was laid along one side of the excavation and supplied with air by the Worthington compressor, supplemented at times of heavy demand by a 105-cubic-foot LeRoi. Tongue-and-groove lumber, 3 inches thick, 8 and 10 inches wide and in varying lengths, was used for vertical sheeting. Two men excavated under the toe of each piece of lumber as it was driven by an Ingersoll-Rand pneumatic sheeting hammer handled by two men. The horizontal wales of 10 x 10-inch lumber were spaced according to the depth of trench and side pressure. Such good alignment was maintained by this method that the sheeting served as outside forms for the invert and the lower half of the sewer.

C. & E. M. Photo
Laying invert and setting forms for the Ingleside sewer.

(*Concluded on page 71*)

THE STRONGEST GEARED POWER FOR ITS WEIGHT IN THE WORLD

ALL STEEL HAND HOIST
SEATTLE, U.S.A.

Compact—Powerful—Safe

STANDING ROOM ONLY FOR DURATION

Beebe Bros. All-Steel Hand Hoists carry the highest resale value of any piece of equipment in the world. If you have one not in use, sell it. Many more than are available are urgently needed in the win-the-war program. Thanks.

BEEBE BROS
2724 6th Ave., So., Seattle 4, Wash.

"make no LITTLE plans"...

The task is great... the incentive tremendous... the goal can be reached if sights are set high!

THE GOAL is a highway system based upon actual post-war needs. To make up for lost time, a doubled highway construction program will be necessary for at least three years. Actually, the program should be more than twice the pre-war size, because highway construction was far behind real needs when this nation entered the war.

THE INCENTIVE is a post-war national economy with the full employment and high national income that exist when, and only when, construction activity is at a high level. Jobs must be waiting when the war is over . . . jobs for eight to ten million men in the armed services when they come home.

THE TASK facing the highway profession is that of providing for the full-sized post-war highway program that will meet the nation's economic needs. Great danger lies in the lack of realization of the size of the job to be done. There must be a reservoir of highway projects of sufficient size to insure an annual program of three billion dollars. Every state, county, city, and regional area should have a program of highway construction *complete with plans, specifications, and cost-estimates.*

The post-war period will be a challenge to American ingenuity, and the highway profession will meet the challenge. But not with LITTLE plans. Little plans will not get rid of worn-out, obsolete roads and streets, unsafe bridges, and traffic congestion. Little plans will not build express highways between cities, or arterial routes into and through cities. Little plans will not provide the sound program, based upon the nation's economic needs and actual highway needs, which will pay dividends far beyond the cost. Make no LITTLE plans!

AUSTIN-WESTERN COMPANY
Aurora, Illinois

BUILDERS OF ROAD MACHINERY
Austin Western
SINCE 1859
BUY MORE WAR BONDS

Equipment Overhaul In Ala. Highway Dept.

Main and Division Shops Divide Responsibility; Kilby Shops Handle Major Repairs, Cover 8 Acres

Part I

✦ EIGHT years ago the Kilby Shops of the Alabama State Highway Department handled all of the light repairs and the heavy overhaul for the entire state. Today the well-equipped division shops, of which there are five, do the light repairs and tune-up required on both maintenance and construction equipment, thus eliminating the need to haul every piece of equipment requiring minor work to the main shops near Montgomery.

The Kilby Warehouse

The Kilby Warehouse, where the bulk of the parts and materials for the use of the Construction and Maintenance Bureaus of the State Highway Department are stored and issued to the division shops on requisition, is located in a 346 x 60-foot galvanized-iron building. This makes it possible to have ample space around the six double rows of parts bins for a hand truck to operate easily. In the section where truck parts are stored, the racks are labeled with the name of the truck, and all of the parts for that make are stored there instead of all parts of a similar type being stored in a single rack.

Although the warehouse is of complete fireproof construction, there are numerous acid-and-soda fire extinguishers strategically located throughout the storage area. These are, of course, particularly necessary where the "black gold" tires awaiting retread or the few new tires awaiting their turn on field equipment are stored.

The Main Shops

The shops at Kilby are housed in a building of the same type and size as the warehouse. A central line of wooden columns divides the shops into bays, each of which is a separate repair stall equipped with a mechanic's metal-top bench and a lock cabinet for tools and new parts ready to be installed. At each stall also is a four-drawer wooden chest for the storage of parts from a torn-down truck which may be awaiting one or two new parts to permit completion of the work. By having the parts stored away, out of the dirt and dust and separate, there is no chance of getting them mixed while the truck is moved away to open storage and another is put in its place for overhaul.

At the center of one side of the shop is the tool room and office, each of equal size, about 20 feet square. Adjacent, in a lean-to outside the main building, is the generator shop, equipped with an Allen Unitron battery charger and a General Electric Tungar charger. A special tester has been built to drive the generators at variable speeds to insure their proper operation when put back in the trucks. Close to the office is the toilet and bath house for the men working in the shop.

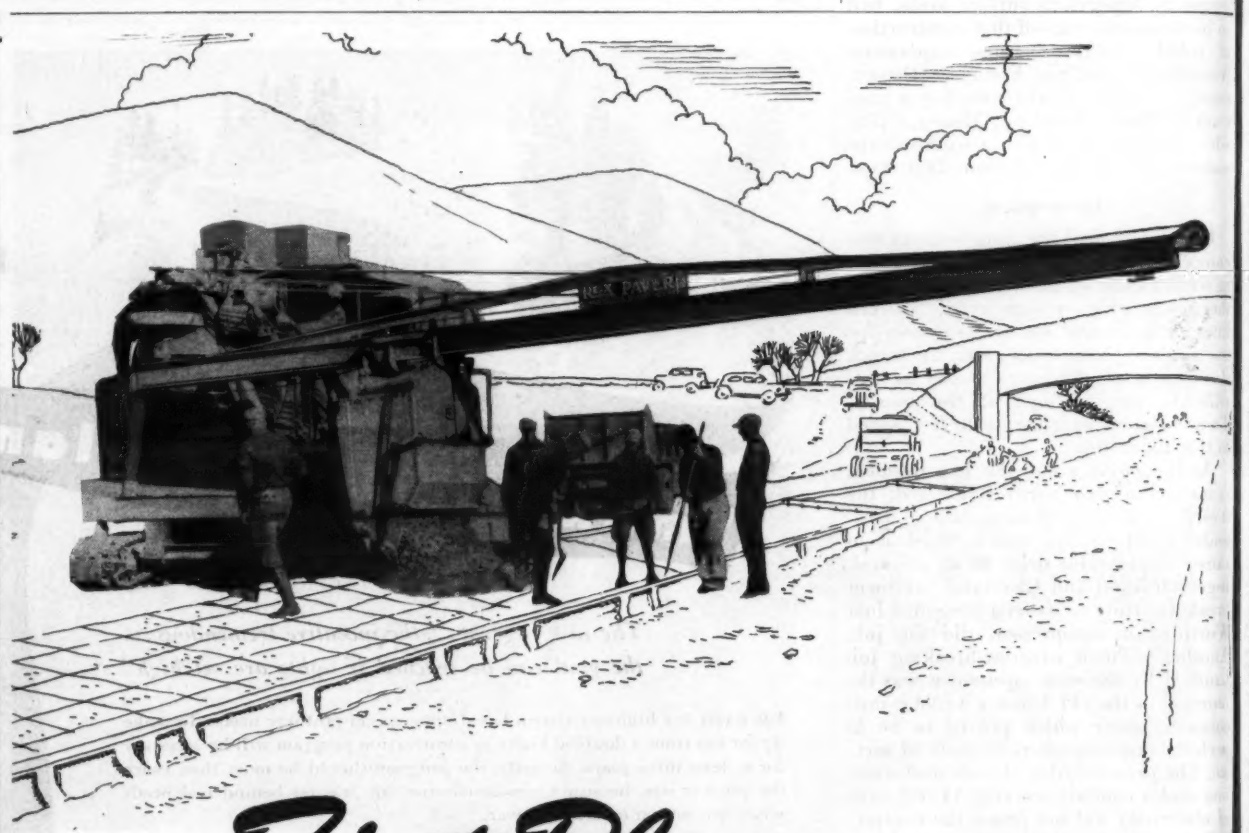
The radiator department is the next in line, with a Canton Foundry floor crane handy for moving the heavier radiators to and from the shop to the outside heated Oakite bath for cleaning.

The gasoline-motor department has very complete equipment for rebuilding motors for the entire line of trucks used by the state. It has an arbor press, a Sioux valve-facing tool, a stand for running-in engines that have been overhauled, with a separate motor for driving them. A set of rebabbitting pots permits melting and casting bearings for all types and sizes of construction equipment. Next is a Van Norman reamer drive and a home-made stand for motors under repair, made from an old grader wheel and provided with holes and pins so the motor can be locked in the most convenient position for the work to be done.

Along each side of the motor department is a monorail for the easy handling of the engines as they are removed from the trucks. Three Sioux electric hand drills of various sizes are used here. Other stationary equipment installed here includes a Van Norman cylinder grinder slung from a monorail and having a turnbuckle to permit lowering or raising it easily; a Van Norman valve-seat grinder; an Automatic Maintenance Machine Co. machine for boring connecting rods; a Sunnen connecting-rod aligning jig and an Ohio clutch-rebuilding machine. At the end of the shops is an area set off for checking the alignment of truck wheels and their balance with a Manbee outfit. Near this end is an Ingersoll-Rand garage compressor which supplies all the air for the shops.

The blacksmith and welding shop is in a large lean-to and is fully equipped for any blacksmith or welding job. It has the usual forge, anvil, a large bending block with a second one used for a welding stand, an overhead hoist for handling the heavier parts to be repaired, and a Hobart portable electric welder. The shop is also equipped with a portable acetylene welder using cylinders and also acetylene piped from the large generator

(*Concluded on page* 32)



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2,000,000 square yards of concrete . . . the equivalent of 180 miles of 20-foot road, and still going strong . . . that's the record of one Rex double drum paver. This exceptional concrete placing performance is typical of Rex pavers. For consistent, high production yardage performance . . . built-in stamina and ruggedness for the toughest jobs . . . Rex 34E double drum pavers are the leaders in the paving field.

In the Rex 34E, the batch transfer and entire mixing cycle are automatically controlled to the split second by the famous Rex Mechanical Man . . . a feature that eliminates expensive wasted seconds. And the roomy, clear vision operating deck makes for ease of operation and faster job progress. The extended crawlers provide stability and allow the boom and bucket to be swung at right angles to the machine without tipping.

For complete information on Rex Pavers and how they can help speed your jobs, send for your free copy of Bulletin 407. And check the other Rex construction equipment: Moto-Mixers, to speed the mixing, hauling and placing of concrete . . . Pumpcretes, the pumps that pump concrete by pipe line . . . Pumps that move water economically and efficiently . . . Mixers that cut concrete mixing costs. See your Rex Distributor or write Chain Belt Company, 1666 West Bruce Street, Milwaukee 4, Wisconsin.

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JAEGER "SURE PRIME"

—the Pumps that exceed their promises

with up to 5 times faster priming, with hi-head, hi-capacity performance, with thousands of extra hours of trouble-free service.

Self-cleaning design, replaceable liners, longest life seal, heavy duty construction thruout.

Every unit individually tested and certified — you know you're getting the best.

Sizes 3000 to over 200,000 G.P.H.

52 Lb. Suction —3000 G.P.H.

THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio

Somewhere in England. A Blaw-Knox 20 to 25-foot finishing machine working between B-K forms on a modified circular type of hard-standing area at a U.S. Air Base.

The Key to Harmony For Post-War Plans

If every state and county highway department will lay the facts on the table, telling the public that the nation's trucks are taking 25 per cent of the total freight load with only 5 per cent of the railroads' carrying capacity; that serious damage can be expected to the highways, thereby resulting in heavy post-war maintenance or replacement cost; advise them of immediate post-war construction plans and educate them to realize that, with increased post-war traffic, many outmoded highways will require modernizing; highway departments will find the people rallying to their support.

"The best defense is a good offensive." With no construction work underway, with protective maintenance curtailed and deterioration apparent, the taxpayer will become critical unless he knows the reason. The best defense, therefore, is a thorough and continuing educational program covering the present-day problems and the post-war highway plan. By means of the press, and by personal contacts, no stone should be left unturned in the effort to keep the taxpayer advised regarding the protection of his investment in highways and the need of every highway dollar for highway work.

From a paper presented by R. P. Ellison, Virginia Department of Highways, at a meeting of the Committee on Public Relations and Publicity, American Association of State Highway Officials, Chicago, Ill., December 2, 1943.

New Alaska Highway Is Not for Tourists

Official sources in Ottawa recently reported in *Engineering and Contract Record* that the new Alaska military highway will probably join the Canol project as an enterprise justified as a war measure, but one which has a very poor post-war outlook.

Ottawa believes that the highway, because of its inaccessibility, will not be an active post-war asset as a source of tourist revenue, its only value being in a military sense, although the Dominion Government does not intend to abandon the road once it has possession and control after the war. *Engineering and Contract Record* quotes one responsible official as saying, "It will be kept passable as a military measure. Public opinion would not concur in any such short-sighted policy as abandonment in view of the possible military value of the highway in some future emergency."

The estimated cost of maintaining the highway after the war runs as high as $6,000 a mile, or almost $10,000,000 a year. These figures are felt to be too high by Dominion officials who feel that the annual maintenance cost will not exceed $2,500,000.

According to General George B. Marshall's report, the United States had spent, up to the end of 1943, a total of $115,000,000 on the Alaska Highway and the eventual total cost may be as much as $125,000,000.

New Self-Emulsifying Degreasing Solvent

A degreasing solvent for cleaning engines, equipment parts, and paint prior to repair and general overhaul, which is non-explosive, non-caustic and produces no toxic vapors, is made by The Curran Corp., Malden, Mass. This Gunk P-96 consists of an Alkyl-phenolic amino emulsifer base of vegetable origin and comes in a concentrated form to be diluted with low-cost kerosene or light fuel-oil distillate, in the ratio of one gallon of concentrate to nine gallons of kerosene or distillate. The producer states that the Alkyl-phenolic types of Gunk exert a powerful digestive as well as emulsive action on carbonized oils and grease. The high boiling solvents do not evaporate from a warm engine block, and when rinsed with water, preferably hot although cold water works as well except more slowly, the dirt and grease disappear in a milky oil-in-water emulsion.

This compound is available in two grades, Commercial and Technical, both equal in performance but varying in refinement and mildness of odor, which is of phenol. Gunk P-96 is available in 1, 5, 30, and 50-gallon drums, the 5-gallon drum making 50 gallons of ready-to-use grease cleaner.

A bulletin giving further details on Gunk P-96 and its many uses, and answering many questions about it, may be secured direct from the producer by referring to this item.

"UNIVERSAL" LEVEL TRANSIT

For Greater Accuracy, Sturdiness and Precision Expertly designed for running levels and taking vertical angles on all survey and check-up operations. Patented Ball Bearing Race assures perfect adjustment. Features of higher priced models. Write for information, prices and FREE bulletin on complete line of surveying instruments.

Expert Repairing . . . All Makes of Instruments

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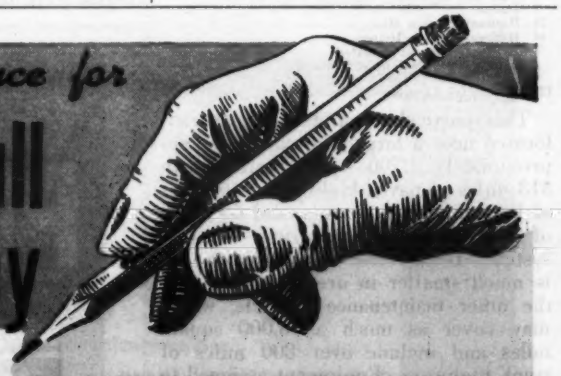
How to check your performance for

Maximum Tournapull Operating Efficiency



LOADING . . . Check These Points ✓

1. Are loads heaped each trip?
2. Is the load being obtained in 100 feet or less?
3. Is the load obtained in 1.0 minute or less?
4. Is traffic control keeping units coming into the pit at intervals of 1.5 to 2.0 minutes so that the pusher tractor will work efficiently—and so avoid unnecessary waiting by Tournapull units?
5. Is the pusher step-loading to reduce lost time and travel in the pit? (See job photo below right)
6. If the material is too hard to load in efficient time and distance, is Rooter being used to break it up?
7. Always establish down-hill loading. It's rarely ever impossible.

TRAVELING . . . Check These Points ✓

1. Are roadways good enough to allow high gear travel at all times? 14 m.p.h. or over? If not . . .
2. Is the Tournapull-Scraper being used to keep haul roads in good condition? Or is a patrol available as the logical tool for this work?
3. Is each turn being made in .25 minute or less?
4. Is the operator utilizing full r.p.m. to obtain the quickest acceleration—thus increasing average speed?

SPREADING . . . Check These Points ✓

1. Are loads being spread in the highest possible gear?
2. Is spread made in .5 minute or less?
3. Is spread being made in 65 to 100 feet (approx. 8 inches to 5 inches loose depth)?
4. Is operator getting off the fill as quickly as possible?

MECHANICAL— (Check with LeTourneau Maintenance Manuals) ✓

1. Are all adjustments maintained?
2. Are blades installed properly to maintain sharp cutting edge?
3. Is all cable running free?
4. On hard smooth roads, are tires at maximum pressure? (See LeTourneau Tire Chart)
5. For off-the-road work, are tires at minimum pressure, in relation to the load, to obtain flotation? (See LeTourneau Tire Chart)
6. Are all mechanical moving parts greased and operating freely? (See LeTourneau Lubrication Chart)

Use this Simple LeTourneau Check-List—It Covers Your Complete Earthmoving Cycle, Shows You How to Move Bigger Loads Faster and at Less Cost

To help you take fullest advantage of your Tournapulls' ability to move bigger yardages fast, here is a quick, easy way to check every operating step. This simple Tournapull check-list, prepared by the LeTourneau Field Engineering Department, shows you how to keep your rigs working at top efficiency in the cut, traveling and on the fill. Use it regularly for your Tournapull check-up to eliminate waste time and speed yardage output.

Another Time-Saver—Dealer Service

If your check-up shows a need for parts or repairs, call on your LeTourneau-"Caterpillar" dealer. He's equipped to handle your service problems with a minimum of time out for repairs.

LeTourneau Co-Operator Offers More Help —Write for Copy

To keep your operators and repair crews informed on the most practical operating, service and repair methods, The LeTourneau Co-Operator is offered to you and your men FREE. 16 fact-packed pages . . . published 10 times yearly. Read regularly by over 50,000 contractors, loggers, miners and others who use and service LeTourneau equipment. Write for your copies TODAY. Address R. G. LeTourneau, Inc., Dept. CEM-244, Peoria, Illinois.

As loaded Tournapull pulls out of the pit, pusher tractor is ready to swing around and contact second Tournapull, already loading in opposite direction.

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.
*Trade Mark Reg. U. S. Pat Off.

LETOURNEAU PEORIA, ILLINOIS STOCKTON, CALIFORNIA

Organizing to Fight Snows in Minnesota

(*Continued from page* 1)

who have practically unlimited authority and great responsibility, are the District Maintenance Engineers, sixteen in number, each one of whom directs all snow-removal operations in one of the sixteen maintenance districts into which the state is divided. With their force of 60 to 80 regular employees, plus such additional laborers as conditions may require them to use, they fight the fight and win the battle.

The organization of a typical maintenance district follows:

1 District Maintenance Engineer
1 Highway District Foreman
2 Highway Maintenance Foremen
1 Labor Foreman
1 Garage Mechanic Foreman
4 Garage Mechanics
2 Garage Mechanic Apprentices
1 Mechanic Stock Clerk
1 Sign Man
1 Janitor
24 Highway Section Men
24 Highway Section Helpers
3 Heavy Equipment Operators
3 Maintenance Equipment Operators
5 Clerical
177 Temporary Laborers

This particular maintenance district, located near a large city, comprises approximately 1,700 square miles, with 313 miles of paved highways, 140 miles of light-bituminous roads, and 65 miles of gravel roads in the trunk highway system. Being close to large cities, it is much smaller in area than some of the other maintenance districts, which may cover as much as 8,000 square miles and include over 800 miles of trunk highways. Equipment assigned to this district for use in snow-removal and sanding operations includes the following:

1 3 to 4-ton Mack truck
4 2½-ton Mack trucks
1 Walters truck
1 3 to 4-ton FWD truck
2 5-ton FWD trucks
1 FWD truck
1 2-ton Federal truck
1 2 to 3-ton Diamond T truck
2 2 to 3-ton GMC trucks
5 2-ton Dodge trucks
2 1½-ton Dodge trucks
6 1 1/3-ton Ford dump trucks
1 1½-ton Ford dump truck with Marmon-Herrington drive
2 Snogo rotaries
3 American V-plows
3 Frink V-plows
1 Sno-Flyr V-plow
1 Ross V-plow
7 C.S. V-plows*
6 C.S. 12-foot snow wings*
1 C.S. 10-foot snow wing*
4 C.S. snow wings*
1 Bros 12-foot wing
1 Ross snow wing
1 Wausau snow wing
6 Burch truck wings
3 Snow wings (own make)
3 Baker one-way plows
6 Ross one-way plows
7 North Star one-way plows
5 Bros one-way plows
1 American one-way plow
7 One-way plows (make unknown)
1 North Star Model 110 V-plow
2 Austin-Western 77 graders
2 Austin-Western diesel-powered graders
1 Galion power grader
1 Shawnee motor grader
4 Briland spreaders
4 Sand spreaders (make unknown)
8 Highway Model I sand spreaders
2 under-truck ice cutters
1 steam thawer
*—Made in the Highway Department Central Shops

The above equipment was observed in one maintenance district only, but an inspection of the office records disclosed that substantially all makes of well-known machines are represented in the roster of Minnesota's state-owned equipment. Minnesota buys its equipment on a strictly competitive basis and low bidders meeting the specifications, which are not too restrictive, are always awarded the sale.

Minnesota has experimented extensively with various types of one-way plows and finds it essential that the plow's top edge run ahead of the cutting edge and its overhang point downward to prevent throwing snow back over the plow onto the truck rather than throwing it sideways as desired. Minnesota specifies the designs of its snow-plow shapes and then takes bids on their manufacture and delivery from interested producers.

All plow trucks are equipped with two blue spotlights shining both fore and aft, a large red stop light, an orange spotlight shining on the left end of the plowing blade, and a white light directed at the blade or wing tip to help the operator's guidance of his machine. Canvas covers are used under the motors and over the radiators to keep the snow from damping out the electrical circuits, and Durkee-Atwood or Hilger frost shields are in place on all windshields and windows, held by the adhesive back which forms an integral part of the shield.

Radiators are protected by Prestone or Firestone Frigitone, ordinarily to a temperature of minus 20 degrees, but additional protective liquid is available when needed. All anti-freeze compounds are removed and barrelled in the spring for re-use the following winter. The addition of good commercial rust inhibitors to the liquid has materially reduced the loss through sludge formation.

Winter maintenance equipment is assigned to the various section men and stored in twenty-four state-owned or leased garages, located strategically throughout the district, each of which contains stocks of fuel and lubricants in a well constructed and properly heated building having telephones and a small supply of replacement parts as well as ample storage space for all equipment assigned to the section.

At District headquarters, maps plus equipment lists serve as operations charts for central control and, with a full knowledge of equipment available and reports constantly received from the field, the District Maintenance Engineer shifts his forces as a general in battle does his armies. With such a well organized plan of operations, the handling of snowfall from the ordinary storm is a routine procedure, executed without delay and often without serious incident, but the problem is not always that easy.

Wartime incidents, such as the loss of eight Snogo rotary plows which were requisitioned by the Assistant Secretary of War, difficulties encountered in securing replacement parts, loss of personnel to the armed services (17 have already gone from one district), and some loss to industry, have all tended to disorganize the procedure. The desire to have at least two qualified drivers for each piece of equipment is almost impossible of attainment.

Instructions to Operators

All employees are furnished with printed instructions regarding plowing and sanding, as follows:

(*Continued on next page*)

When your problem involves

PLACING CONCRETE . . .

Illustrated: Economy Steel Forms in use on ① Foundation ② Box-Tunnel ③ Sewage-Treatment Plant

Buildings, foundations, tanks, tunnels, culverts, bridge-piers and abutments, all are easily formed with standard Economy units. Economy service provides estimates, form-erection drawings, forms and accessories, trained foremen and plate-setters for contractor to employ. You rent Economy equipment, only as much as you need, only as long as you need it. RESULT: substantial savings in time and material. On any project, be sure your bid takes advantage of these savings.

. . . the RIGHT answer includes

ECONOMY STEEL FORMS

A nation-wide form-rental and engineering service that saves critical material and time in concrete construction. We welcome job inquiries by letter, wire or telephone

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TRANSITS and LEVELS

HEADQUARTERS for REPAIRS—any make

We will buy or trade in old Transits, Levels, Alidades, etc. Send instruments for valuation.

Write for new Catalog EC-92 of Engineering Instruments, Engineering Field Equipment and Drafting Room supplies.

WARREN-KNIGHT CO.
Mfrs. of Sterling Transits & Levels
136 N. 12th St., Philadelphia 7, Pa.

Minnesota Department of Highways Photo

"It isn't snow which usually blocks roads—it's traffic," says C. L. Motl, Minnesota State Highway Maintenance Engineer.

Detailed Instructions Aid in Snow Plowing

(*Continued from preceding page*)

TO: ALL EQUIPMENT OPERATORS
Gentlemen:

REPORT TO DISTRICT OFFICE

In the event of a snow storm or blizzard that looks as though plowing has to be done, get in touch with this office immediately and report the conditions. Be sure your plows are ready to hook up. Have all trucks filled with gas at night and checked over to see that they are ready to go on short notice. If conditions are bad, do not wait for orders from this office, but go out immediately and call in when a telephone is available to report conditions as you have encountered them. As has been the custom in the past, when it is storming, call this office as often as possible and report conditions. Another plow in your vicinity might be in trouble and, by your frequent reports, aid might be sent them. This, of course, would be true if you were the one in trouble. Be sure and call this office every day, WHENEVER DANGEROUS CONDITIONS EXIST ON YOUR SECTION, such as slippery spots, bumps and roughness. These dangerous points should be flagged and flared unless the condition is general.

SPEED OF PLOWING

"THE SPEED OF THE UNIT WILL ALWAYS BE AT THE JUDGMENT OF THE OPERATOR". Use speed only when you deem it safe and be very careful on the shoulders of the road, if the ground underneath the snow has not frozen. In general, plowing operations should be carried out at a good rate of speed to throw the snow, rather than push it into ridges. Ridges might have to be left on the first trip through but, after the initial trip, do not take more than the plow will handle at a reasonable speed, so that it will throw, rather than pile up.

WINGING

In winging, keep the wing end off the ground and keep the wing high enough and at enough slant so that the snow will be thrown and not piled up at the end of the wing. In case of deep drifts, point the wing at a good slant upwards and take only enough snow off the drift so that speed can be maintained. Where windrows have to be formed, see that they are not pushed out so far that the wing cannot reach them. In winging on the pavement, keep wing down clean. In winging on gravel roads and shoulders, be sure to leave enough snow on the shoulders of the road for sleighing. Care should be taken that mail boxes and warning signs are not knocked down. If this does happen, see that they are replaced.

PLOWING THROUGH TOWNS

The above instructions do not apply to plowing in towns. A good many complaints have come to this office that plowing has been done too fast in towns, and that sidewalks that have been cleaned off have been completely covered after the plow has passed. Unless advised otherwise that there is some special agreement with the town, plow the middle 20 feet of the street, at a slow rate of speed and, if necessary, knock down any windrow outside of this area, so that local traffic can drive or park on the rest of the street.

CARE OF SIGNS

When warning signs become obscured by snow, they should be dug out so that they are readable from the highway. Piles of snow that are left by the wing by sign posts and mail boxes should be shoveled into the ditch so that they will not cause a drift to form. If time permits, guard rails should be shoveled out so that they will not cause drifting.

TRUCK LIGHTS

Blue lights on all snow plows are to be used only when plowing, or winging or sanding, and this rule applies both night and day. Whenever a truck is standing, see that the motor is idling fast enough to keep the generator charging and that only the necessary lights are burning.

CLOSED ROADS AND APPROACHES

In plowing operations you should open cross-road approaches which have been previously plowed out as soon as possible during the operation.

RAILROAD CROSSINGS

When approaching railroad crossings, come to a full stop and raise your plow. After crossing the track, go back into the crossing immediately and clean out any snow or anything else which might have fallen into the flangeways of the crossing. There have been several train derailments due to the fact that this cleaning out of the flangeways was not taken care of immediately. Railroad section men watch this very closely and you should watch it just as closely.

BRIDGES

Slow up at all bridges that have steel expansion plates on the floors. Care should be taken in crossing these expansion plates. Some very serious accidents have occurred when cutting edges have caught on these plates. On all narrow bridges, after plowing operations are complete, snow and ice should be removed up to the bridge railing and all drains in the bridge opened. Never go over a bridge with equipment that is greater in weight than the posted limit.

HELPERS

Remember that the helper on the truck is not along "just for the ride". The helper should be out of the truck to flag whenever you back up and out helping untangle traffic tie-ups when encountered.

EQUIPMENT REPORTS

Please do not fail to report time, unit numbers and hours, for plows and wings as well as for trucks. When you use a service truck, report unit numbers and miles.

Yours very truly,
DEPARTMENT OF HIGHWAYS,
District Maintenance Engineer

TO: ALL EQUIPMENT OPERATORS
Gentlemen:

RE: SANDING

Sanding has become an operation of this Department that the public has been depending upon more and more each year. When slippery conditions occur, you are bound to be criticized severely if they are not taken care of immediately. If conditions in the evening, after sanding has been carried on during the day, in your opinion seem to warrant it, be sure to get in touch with the off-shift man and advise him just what sanding has been done, and where you think conditions warrant additional sanding. If the off-shift man on your section is not available, get in touch with this office, your foreman, or myself. Sanding operations should be considered as coming first, before all other work on your section.

When icy conditions occur, sanding should be done with sand from stockpiles. Stockpiles should be placed as heretofore with sand that has had 75 pounds of calcium chloride added to each cubic yard. This will take 1½ sacks of calcium chloride to a 2-yard load of sand. If sand is used directly from the pit, be sure the sand is moist before adding calcium chloride. If the sand is very dry, not over 5 or 6 gallons of water per yard should be added. Do not add so much water that the water drips from the load.

Sand all approaches to railroad crossings and intersecting roads of importance, all curves and hills. Then replenish from the stockpile as your time permits. If ice occurs on the highway in short patches, these should be sanded also, even if they are on the straight-away. This can be done when the above-mentioned points are all sanded.

Some accidents have occurred while our trucks were sanding. When traveling and sanding at less than 10 miles per hour, in the daytime, carry a red flag on the left-hand corner of your load. This flag should be removed when you are not sanding and traveling at a greater speed. At night a lighted flare should be on the pile of sand on the truck and blue lights burning. When very serious icy conditions occur on your section, notify this office immediately so that the Central Office can be notified.

Yours very truly,
DEPARTMENT OF HIGHWAYS
District Maintenance Engineer

(*Continued on page* 38)

NEED A BIG Trailer?

La Crosse Makes Them Up To 200 Ton Capacity

** WRITE OR WIRE **

LA CROSSE TRAILER & EQUIPT. CO.
LA CROSSE, WISCONSIN U. S. A.

COMPRESSED AIR *where you want it...even when the going is tough!*

No matter where you need compressed air in construction work—Schramm's hard hitting, versatile Compressors get right next to the job and furnish all the air you want.

Note the tough job Schramm is easily handling in this photograph of demolition work. The fact that Schramm is lightweight—compact—without losing any of its ruggedness—enables you to move Schramm anywhere.

These features are exclusive: 100% water cooled... Built as a unit... Mechanical intake valves... Push button starter... Larger discharge valves which cover almost the entire area of the piston heads.

Specify Schramm. For further details write for Catalog 42-PA.

SCHRAMM INC.

Fabricated and erected by Truscon Steel Co., these hangar doors employ a new sheathing material which will find many uses in post-war construction. Of Douglas fir plywood pressure-treated with Minalith fire-retardant after manufacture, classed as "exterior" type, this Resnyrest plywood, ⅝-inch thick, is glued with a waterproof adhesive.

Constructing Doors For Timber Hangars

(*Photo on page 72*)

When Navy designers planned the giant flameproofed wooden hangars for the blimps of the coastal patrol, they had few structural precedents to guide them. Never before had such huge structures of timber framing been built. However, nearly a score of the giant hangars have already been completed under the plans drawn up by the Bureau of Yards and Docks, U. S. Navy. Essentially these structures consist of an oval-arched roof, stiffened by a series of arch ribs, and two end doors. The hangars are approximately 1,000 feet long, 170 feet high at the crown, and nearly 300 feet wide at ground level.

The doors for the huge openings at either end of the hangars presented an unusual engineering problem. It was necessary to construct them to be independent of the main building so that they would not weigh upon the hangar framing as the latter could not be built to resist either the weight of doors generally used for steel hangars of similar size and shape, or the wind pressure which is transmitted from doors of such immense area. To meet these design problems, two types of doors were finally selected: a flat sliding door with separate support, and a semi-dome door which is self-supporting in any position from open to closed.

To guide the flat sliding type of door, twin reinforced-concrete pylons were constructed to support an enormous square built-up timber girder. Most of these installations were made by Byrne Doors, Inc., whose multi-leaf electric operators close or open the six sections of the doors at the touch of a button. The leaves are 120 feet high and are supported laterally by guide rails at the top. They roll on flanged steel wheels over railroad-type tracks, and the operating mechanism is so engineered as to move the several segments or leaves at differential rates of speed so that all three leaves arrive at open or closed position simultaneously.

The basic requirements of rigidity, light weight, and large size posed a design problem which was met at three different bases by three different combinations of materials, including one new product, flameproofed plywood. One solution to the door-construction problem uses steel frames, actually box trusses on end, faced with pressure-flameproofed 1 x 6 tongue-and-groove pine sheathing, nailed to purlins on the truss face. Another design incorporates steel longitudinal members stiffened with wood braces which furnish the base to which asbestos-cement boards are fastened. At one West Coast base, the door retains the all-steel truss frame but is sheathed with Minalith-flameproofed fir plywood, mounted on steel angles which are bolted to the truss frame.

Because of its light weight and the large size of the panels, the treated-plywood sheathing permitted faster simpler erection than either of the other two types. No scaffold was required in mounting the plywood sheets on the door panel trusses; the sheets were handled by a Moto-Crane with an extended boom, with two or three men placing and bolting up the panels. Materials used throughout the hangars were prefabricated, and after fabrication the timber used in the structures was shipped to wood-preserving plants to be pressure-treated for fire resistance.

In addition to providing support to the door leaves, the box-beam girder at the top of each door construction carries the enclosure framing for the remainder of the end opening of the hangars. Continuity of the box girder, which measures 21 feet 9½ inches square in cross section, with the towers and the cantilevers is provided by means of chord splices and shear connections anchored into the tower walls.

At one locality, where poor foundation conditions exist, flat doors were found impracticable because of the heavy concentrated loads on the tower bent piers. The semi-dome door, distributing weight over a larger area, was the solution here. With the exception of a center assembly piece of steel at the crown, the semi-dome door is made entirely of flameproofed timber. In fact, 600 tons of structural steel per hangar is saved by the semi-dome method of construction. The door is 159 feet high at the crown, and is shaped like a half-circle with a radius of 120 feet. The door opens at a 90-degree angle, taking a position parallel to the hangar and 400 feet away from the structure when open. On a set of eleven concentrically curved tracks, seventeen Byrne operating trucks carry the huge door. The trucks are complete with their own diesel power units, special gear reduction units, brakes and control devices. The semi-dome door can be operated at three speeds and requires approximately 10 minutes to move from a closed position to a fully open position parallel to the hangar.

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Top Photo: "Spray Master" with Vaporizing Torch Type Burners and Rear Engine Mounted.

Lower Photo: "Spray Master" with Low Pressure Atomizing Burner and Front Engine Mounted.

One valve Starts and Stops the spray instantly! Here is one reason why the Littleford "Spray Master" Pressure Distributors will definitely speed up the Construction and Maintenance of our vital post war highways, roads, streets and airports. This Single Valve Control, the exclusive "Spray Master" feature eliminates the maze of gadgets, controls and valves found on units of this type. Littleford again leads the way to modern, efficient Black Top Construction and Maintenance Equipment. When planning for the future, consider equipment designed for the future.

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Dredging Improves Utility Of Intracoastal Waterway

Hydraulic Dredges Working West of New Orleans Vary In Size, Diesel and Steam Drives; Special Problems

Part II

♦ IN the 77 miles of the Intracoastal Waterway (See C. & E. M., January, 1944, pg. 60) between Vermilion Locks, south of Abbeville, La., and the Calcasieu River at Lake Charles, La., there were four hydraulic dredges working throughout the larger part of 1943 on the improvement of this important route. These included the 28-inch G. A. McWilliams, the 20-inch Tchefuncta, the 22-inch Mobile, and the 27-inch Miami. Each was placed by the New Orleans District, U. S. Engineer Department, where the character of the work would use the size and power of the dredge most effectively. Pumping was generally through short lines, although at times some of the dredges used lines as long as 1,000 and 2,000 feet. Two of the dredges are steam powered and two have diesel engines, while two used "spill barges" for their discharge lines.

Work of the G. A. McWilliams

The G. A McWilliams, owned by the McWilliams Dredging Co., New Orleans, La., (C. & E. M., Sept., 1939, pg. 16) has been working just west of Vermilion Locks in joint clay, a heavy material much like soapstone. To save the extra labor required to operate a long pontoon and shore line, and the time lost from 100 per cent pumping caused by cutting in and removing pontoon sections, the McWilliams used a short pontoon line and a spill barge to place the discharge over the bank.

The spill barge is a derrick barge with an A-frame derrick and hoist to raise the discharge end over the bank. An orifice cut in the bottom of the suspended pipe deposits heavy material to form a levee section which tends to prevent dredged material from returning to the canal. The A-frame is operated by a double-drum hoist driven by a 6-cylinder gas engine. Also mounted on the spill barge is a 2-drum Domestic hoist with a Waukesha motor for handling the anchor line for the barge. The discharge line of the McWilliams leaves the barge at the port stern spud and delivers to the spill barge through three lengths of 50-foot pontoon line with two ball joints for the spill-barge connection.

At the time of our visit, the McWilliams was making a 140-foot box cut, with a maximum width of 155 feet in soft material, running a vacuum on the suction of 15 pounds and a discharge pressure of 55 pounds at the pump. H. H. Coleman is master of the G. A. McWilliams.

The Tchefuncta

The dredge Tchefuncta, owned by Jahncke Service, Inc., of New Orleans, La., is a hydraulic dredge with a 20-inch discharge line. On the work in the Intracoastal Waterway, a 700-foot pontoon line was used with a 1,250-foot maximum line on the bank to keep clear of a road at a ferry crossing. The material in the section in which the Tchefuncta was working was very sandy.

This dredge has a wooden hull 120 x 31 feet 6 inches, equipped with wood spuds 45 feet in length. The power plant is a De La Vergne diesel engine of 880 hp used for direct drive for the main pump at 240 rpm. There is also a 290-hp De La Vergne diesel with a 175-kw Westinghouse generator at 730 amperes and 120-240 volts running at 300 rpm to supply power for the cutter motor and oiling motors. A Buckeye 175-hp diesel running 400 rpm drives an Elliott 100-kw 400-ampere 125-250-volt generator supplying power for the auxiliaries or anything except the cutter motor. A De La Vergne 400-hp diesel drives a West-

(*Continued on page 64*)

C. & E. M. Photo

The discharge from the spill-barge line of the G. A. McWilliams.

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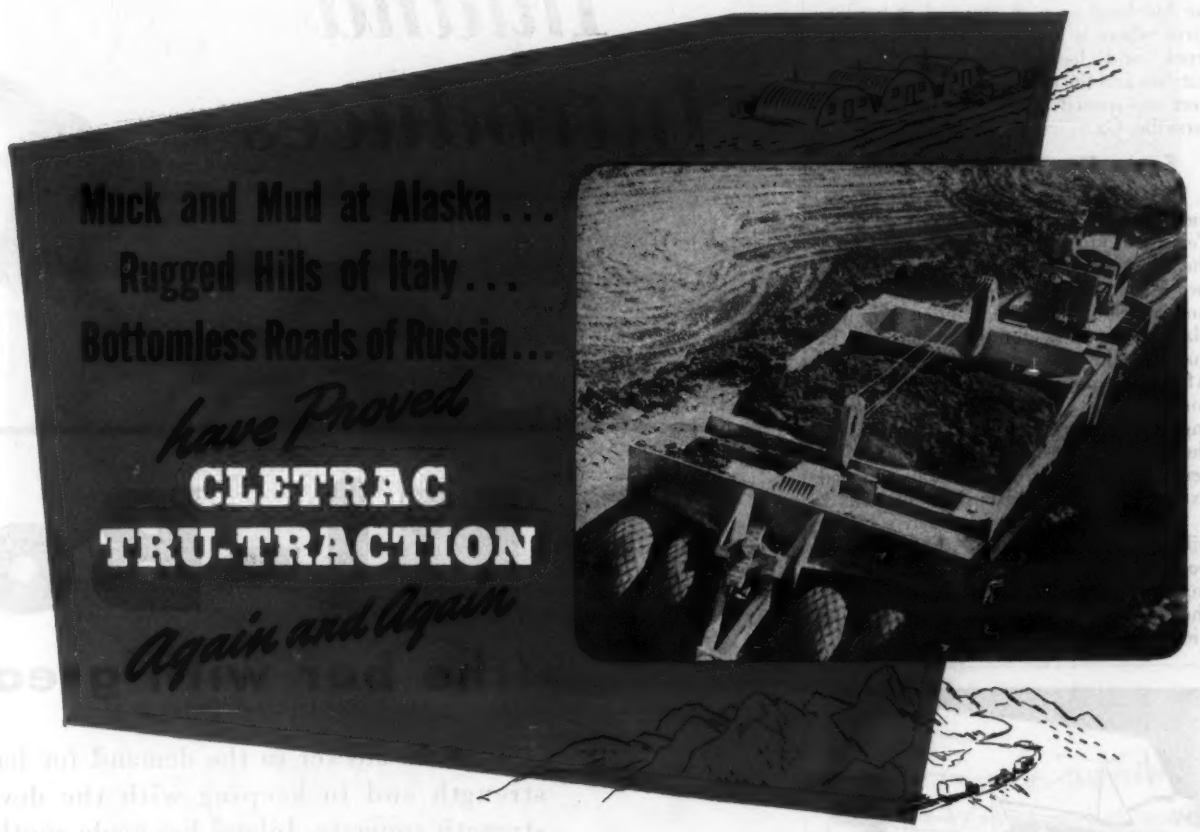

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THE CLEVELAND TRACTOR COMPANY · CLEVELAND, OHIO

CLETRAC *Tru-Traction* TRACTORS

Good Paving Organization For Army Airfield Project

(*Continued from page 2*)

for this job was furnished by the Government which reserved the right to require the use of a blend of slag and portland cements, the proportion of slag cement not to exceed 25 per cent by volume. One batching plant was set up for slag cement and the other for standard, and all trucks stopped at both batchers. To identify the trucks and prevent the least possibility of a truck receiving the wrong amount of cement for its batches, each truck was marked with the size of the paver it served, either 27-E or 34-E, in large black letters on both sides.

The two Heltzel aggregate batching plants and the two Heltzel cement batching plants were strung out over a distance of about 1,000 feet on a spur track. The cars were moved as required by a Caterpillar Ten tractor. The washed and screened sand and gravel were loaded into the batching plants by a Koehring 1¼-yard crane and a Lorain 75, supplemented at times by a Lorain 40.

The pavers were each served by a fleet of twenty-four batch trucks for the average 1½-mile haul over the field from the batching plant. As each truck arrived at the batching area, it stopped at a platform where a man stepped over to the truck and locked the gate between batches and the tail-gate. The batch-truck fleet was owned by Roy Schinall of Cartersville, Ga.

Forms, Fine Grade, and Joints

The thickened-edge trench for the 9-inch Heltzel steel forms was cut by a Ted Carr Formgrader, following which the form setters, one on each side with two helpers apiece, rolled out the line of forms in short order. A wooden strip was placed at mid-height on each form to make the keyway for the adjacent slab. After the pouring was complete, the forms were stripped the following morning, using two utility trucks to transport them forward as rapidly as they were removed. These same trucks also hauled expansion joints and curing compound.

The fine grade was shaped by a Caterpillar No. 12 and an Adams 12-foot power grader and then checked by a rolling device with the pins set to scratch the subgrade where it was high. The device was pulled by one of the graders. For the final treatment, the three fine-grade men cleaned up and then the grade was rolled by a 5-ton Buffalo-Springfield tandem roller.

During the time when the pavers ran on the outside of the forms, the expansion joints were set well ahead by two men. When the pavers ran between the forms, as described below, it was necessary to add another man because of the shorter period for this work during active pouring. The expansion joints were set 120 feet apart and dummy joints cut at intervals of 20 feet. The expansion joints were made up of ¾-inch impregnated fiber with 24 dowels for the 25-foot width. The dowels were ⅝-inch round and 16 inches long, coated with red lead at one end and covered with a metal cap on the other to permit freedom of movement. The dowels were held in a horizontal position by a spot-welded frame of light reinforcing rods, a straight rod at the top to space the dowels correctly, and another in a flattened sine curve for the vertical spacing.

Paving 2,500 Feet Daily

In order to maintain 2,500 feet of 25-foot slab a day with the heavy section used on runway paving, the entire paving organization must run smoothly. This organization ran a minimum of 2,500 feet and closer to 3,500 feet in the two 8-hour shifts run each day.

It is not uncommon for a paver to be run between the forms if the shoulder of a road will not permit its easy handling on that area, but when two large pavers, one a 34-E, are run between the forms, that is news. In this case the 25-foot width of the runway strip was just sufficient to permit the two skips to be lifted and the trucks run in without interference. When alternate lanes were sufficiently cured for running the pavers on them, the pavers were taken out of the area between the forms and put on the paved lanes.

Water for the two pavers was supplied by a pair of trucks with 1,200-gallon rectangular tanks delivering to a truck which went along with the pair of pavers. A small Jaeger Sure-Prime pump was used to transfer water from the hauling trucks to the supply truck at the paver, and then a Rex road pump delivered the water from the 1,200-gallon tank on the supply truck to the large paver. A 1½-inch hose from the 34-E paver was carried across the lane to the 27-E to supply it with water. The sprinkling hose used constantly during the hot dry weather to supply water for the subgrade was tapped onto the 34-E paver line.

Both pavers were Koehrings and the larger one naturally took care of slightly more than one-half the width of the slab. There were four puddlers in rubber boots in front and one at each side of the front screed of the Jaeger-Lakewood double-screed finishing machine. A White vibrator was mounted over the front screed, and the vibrator unit carried by one man

(*Concluded on next page*)

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Koehring pavers running between forms and pouring a 25-foot-wide runway strip at Maxwell Field.

Finishing and Curing Runways at Airfield

(*Continued from preceding page*)

from one side to the other to vibrate joints and the sides.

Immediately behind the finishing machine a Cleft-Plane with one operator and two helpers set the steel for the 1½ x ⅜-inch center strip. This steel was later removed and the slot poured. The same men cut the dummy joints with a device at the back of the machine and inserted the steel.

Two men working from a heavy rolling bridge gave the slab a longitudinal float with a 14-foot bull-float. The finishing crew from here on consisted of seven men. The first two skimmed excess water from the surface with a length of garden hose and then gave it a thorough belting with a 10-inch belt in an unusual frame. We have described the arched board used by many to hold the belt taut, but a span of 25 feet is a little too much for even that. On this job the belt was held by a pipe handle at either end spaced about 28 feet apart by a pipe spanning the entire slab and then the belt was held taut by a rod with a turnbuckle.

From the frame of an old Cleft-Plane on the forms behind the hand finishers, two men pulled the center-joint steel and the dummy joints. Then a rolling bridge was used by the next man pulling the caps from the expansion joints and edging them.

The slab was cured by spraying with a membrane-curing compound, two men being required for this operation.

In order to keep the pavers in operation and reduce the time of shutdowns to a minimum, the 34-E paver carried a complete Lincoln pneumatic-power greasing unit in a cabinet within which was the grease cylinder and about 35 feet of lubrication hose so that the second paver could be greased by the same unit.

Personnel

This contract and the various extensions by authorizations were completed by R. H. Wright & Son, of Columbus, Ga., under the direction of the Mobile District Office, U. S. Engineers. For the entire work on the runways, Major A. D. Dukes was Area Engineer, with Captain H. L. Fuller as Assistant Area Engineer for a portion of the time, and George B. Thompson, Associate Superintendent for the U. S. Engineers, in charge of the concrete work. Claude Mathews was Superintendent for the contractor.

Give to the 1944 Red Cross War Fund.

Use of Manganese Steel In Construction Industry

Something of the challenge to and accomplishment by the construction industry is presented in the new 32-page illustrated bulletin just issued by the American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. The purpose of the booklet is to show the part played by manganese steel, "the toughest steel known", in dredging, hauling, digging, loading, and other operations on construction projects and how the use of this steel for equipment parts reduces costs by minimizing the effects of violent contact with rock, sand, and other abrasive materials.

The book discusses the exhaustive research which has made manganese steel uniformly durable, while work on certain large jobs is described to illustrate its practical application, pointing out the many uses of manganese steel for chains, sheaves, wheels, shovel buckets, dipper teeth, crawlers, pumps, and other parts of construction equipment.

Copies of this bulletin, No. 1143-CI, may be secured by those interested direct from the manufacturer by mentioning this item.

New Griffin Branches

The Griffin Wellpoint Corp., New York City, manufacturer of Griffin wellpoint systems for dewatering and water supply, high-pressure jetting pumps, portable fire pumps and oil pumping equipment, and its associate, the Griffin Equipment & Supply Corp., which makes gasoline and diesel-engine-driven generator sets, lighting plants, portable floodlighting equipment, and marine auxiliary sets, have arranged for the distribution of these products through warehouse stocks located in the South and Midwest.

The Griffin Engineering Corp., 633 No. Myrtle Ave., Jacksonville 4, Fla., will serve the southern district, while the distribution point for the midwest territory will be the Griffin Engineering Corp., 548 Indiana St., Hammond, Ind.

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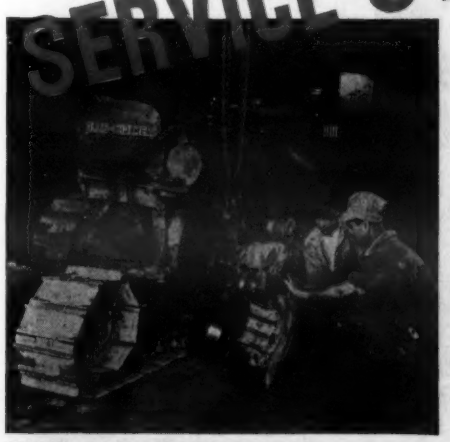

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about machines handle your repairs in Allis-Chalmers shops. Here, two of E. F. Craven's crew apply their skill on overhauling the final drive of the Model WM owned by contractor H. L. Coble, Greensboro, North Carolina.

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After thousands of hours of tough service, this Allis-Chalmers Model WM tractor is ready for more service stripes . . . ready to take what comes for additional years. Owned by contractor H. L. Coble, Greensboro, North Carolina, it returns with stepped-up efficiency to its work on a nearby Army Air Base.

The overhaul included repairing of the final drive, installation of new track rollers and adjustments on right hand track. Yet the job took only three days—which included a one day wait for certain critical parts . . . fast service, considering present conditions and the shortage of vital materials and labor. But E. F. Craven Company, Greensboro, N. C., who handled the job, like other Allis-Chalmers dealers, is equipped to render good service in these difficult times.

Why not get new machine performance by rebuilding your worn equipment! Entrust the job to your Allis-Chalmers dealer and rest assured the work will be handled right and with all possible speed. At all times he has done his best to serve you . . . even under wartime conditions he is doing a mighty fine job. See him . . . today!

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE • U. S. A.

Plans for Orderly Equipment Disposal

(*Continued from page 4*)

post-war years. This would keep employment in manufacturers' shops at near the wartime peak, and prices within reason for both purchaser and seller. But what of those 3,000 new machines in transit when the war ends? They would supply half of one year's requirements, so if they were placed on the market at once there would be a complete disruption of manufacturers' production, which would react disastrously on their ability to produce the machines required for the succeeding eighteen months.

Three methods of overcoming this immediate disadvantage to the manufacturers and the eventual loss to all buyers have been discussed. In Canada, there is talk of a privately owned holding company which will either buy government-owned equipment outright, when and as offered, or provide assurance that the equipment will be sold under a controlled program. If the equipment were purchased outright, it could be turned over to accredited distributors in the territory where the equipment was located, at cost plus handling charges. These distributors could sell such equipment along with new machines at a rate which would not disrupt the local market, and in much the same fashion as most equipment dealers have handled used equipment in the past.

In California a private company has already been formed to handle the sale of all salvaged automobiles and motor trucks. The major purpose is to acquire all surplus motor vehicles from the government on so large a scale, and resell under such control, as to prevent demoralization of the market. This is somewhat similar to the Canadian proposal, and such a company of nation-wide scope, formed by the Associated Equipment Distributors and manufacturers, could do much to stabilize the post-war construction-equipment market, to the benefit of manufacturer, distributor and purchaser.

The third method is proposed by Mr. Salditt, who would have the government sell all new equipment in the distribution-transit stage back to the manufacturers at 75 per cent of the existing production cost, although not actually returning the machines. The manufacturer would be informed of the number and location of his machines, and then could sell them in the open market at a reduction commensurate with his saving and in a definite ratio to the number of new machines being produced. Mr. Salditt suggests one surplus machine for each three new machines off the production line. Under this plan, the manufacturer would not pay the government until he received payment from the customer.

Thus in the three methods of control suggested we have two which involve the creation of large corporations to dispose of the surplus equipment, perhaps one such corporation for each type of machine, and the simpler direct control of sales of each make of surplus equipment by its own manufacturer. We commend Mr. Salditt's plan to the industry and the Government for careful consideration as a practical solution to a problem that will arise at any time—next week, next month, certainly next year. Let's be prepared.

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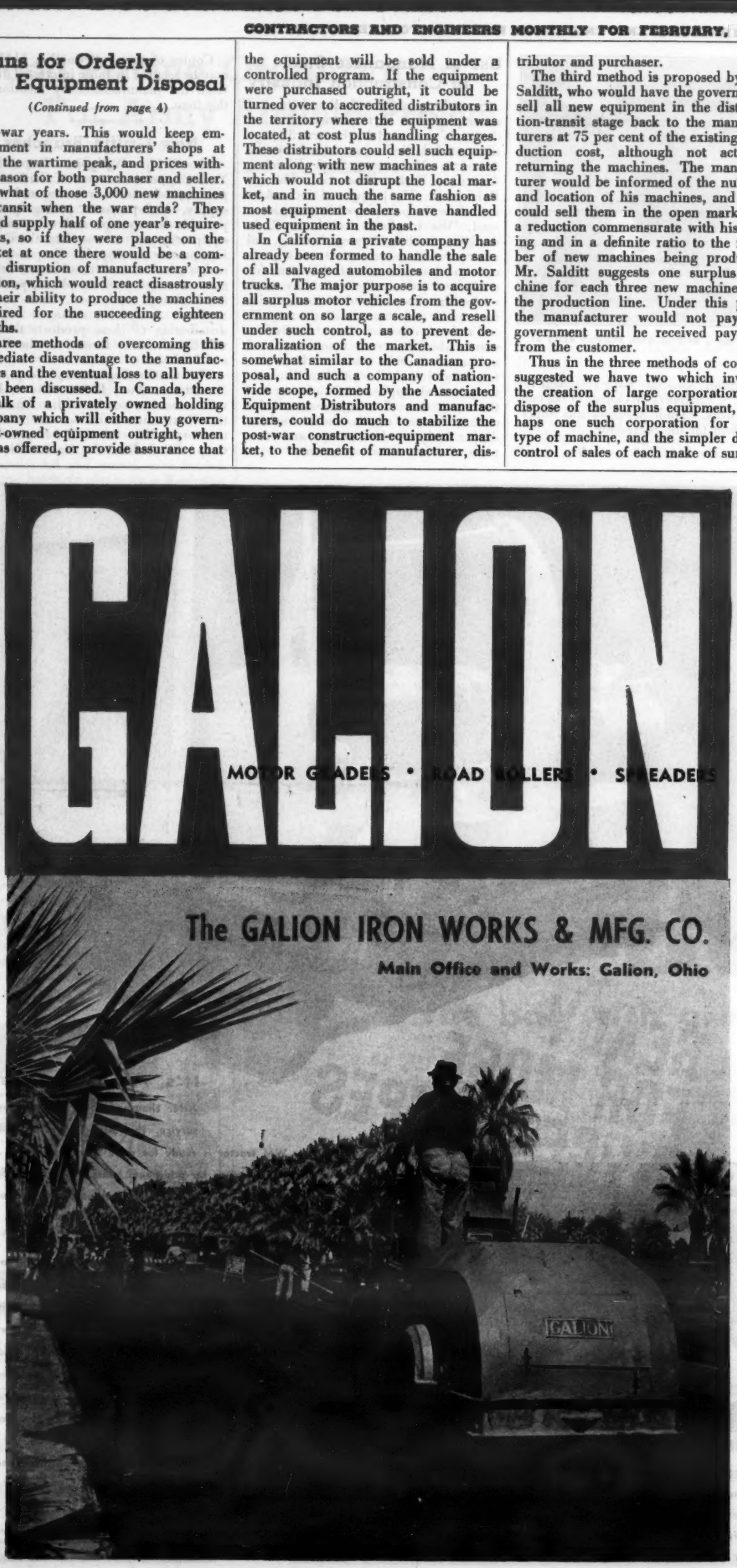

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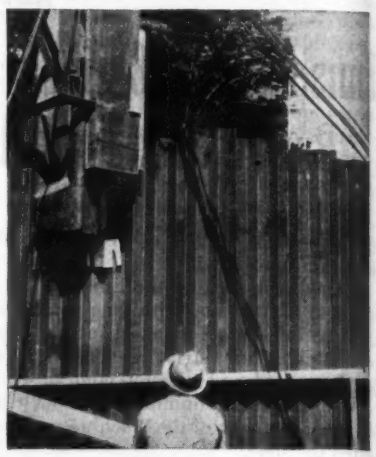

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Order ARMCO Steel Sheeting in the exact gage and width you need. It is supplied in the following types: Flange (12 in. width, 12 to 3 gage, max. length 18 ft.), Clip (12 in. width, 12 to 10 gage, max. length 16 ft.), Interlocking (14 in. width, 12 to 7 gage, max. length 18 ft.). Armco Drainage Products Assn., 325 Curtis Street, Middletown, Ohio.

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Economical Care Of Forest Roads

Low-Cost Maintenance, in Spite of Man-Power and Fund Limitations, Achieved In Connecticut

By W. F. SCHREEDER,
Connecticut State Forests Engineer

LOW-COST maintenance of forest roads is a real problem in wartime when less labor, equipment and materials are available. What Connecticut did to meet this situation is described in this article.

In 1937 the Connecticut State Forestry Department became interested in the maintenance of the ever-increasing mileage of gravel roads which were being built by the Civilian Conservation Corps in the State Forests. Since it was recognized that the Department would have to maintain these roads long after the abundant CCC help had gone, some form of stabilization seemed the best answer. Moreover, the maintenance cost had to be low because of the limited funds available.

The author went to Syracuse, N. Y., to make an inspection of the stabilized roads of Onondaga County. Then a start toward surface stabilization and low-cost maintenance was begun on those roads already built and a modification in the surfacing of new roads was instituted.

Surface Stabilization

The gravel banks of Connecticut, for the most part, are deficient in small stones and clay but have an abundance of coarse sand, intermixed with boulders. The loam overlay, which usually is thin, had been carefully removed and only clean, sharp gravel, mostly sand, had been used as surfacing material.

The stabilization treatment on these roads consisted of blading in from the sides a thin layer of loam, or trucking in this material when it could not be obtained from the roadsides. This layer, about ½ inch thick, was mixed by a road scraper with the top 3 inches of sandy surfacing material and then treated with one pound of calcium chloride per square yard. Later in the year another half-pound treatment was applied. This small amount of calcium chloride was used because the roads were almost entirely shaded. The quantity for the initial treatment was increased to 1½ pounds of the chemical flakes when the road was exposed to the sun.

This chemical treatment maintains the moisture in the road, keeps the dust down, and prevents the wasting of road-surface materials. Naturally, in the shaded portions of the road, not so much of the moisture is lost through evaporation.

On new roads, better consolidation of the surfacing material was achieved by mixing in the loam overlay of the gravel banks. Although hardly sufficient, this soil did provide some binding material. Additional binder soil was made available by having the road crews pile loam at intervals along the road during construction and then spreading this on the gravel as surfacing progressed. These methods gave a much better surfacing, which compacted well and stayed that way when calcium chloride was added to maintain the proper moisture content.

Maintenance

With the roads more or less surface-stabilized, the annual maintenance was taken up. With a road that had been stabilized, no matter how little, the less the top layer was disturbed, the better were the results. Therefore, the maintenance was more a smoothing than a grading job and the grader blade cut only ¼ to ½ inch. Also the finer material which had washed into the gutter was brought back on the road.

Spreading calcium chloride on a forest road in Connecticut to maintain proper moisture content and prevent dust and loss of surface materials.

Grading has been done once a year, in the spring, but throughout the year the roads have been dragged three or four times. Dragging at intervals did as much, if not more, good than scraping. When treating roads with calcium chloride, it was found that the quantities could be considerably reduced over those of the first treatment.

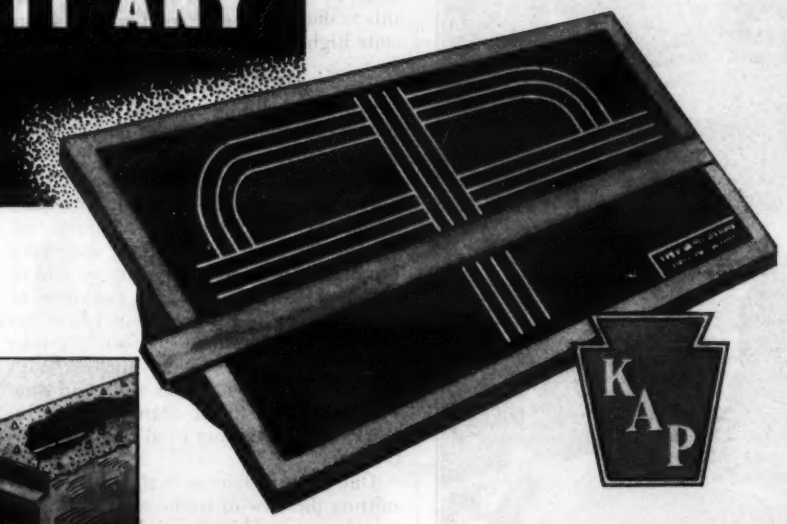
The standard practice now is to treat twice a year, once in the spring, once in the summer, as follows:

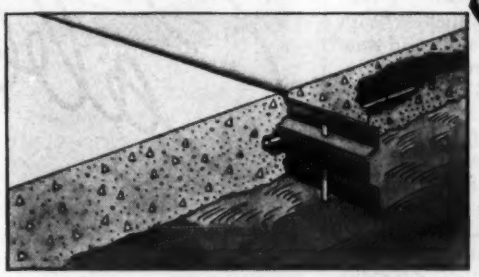
	Lbs. Per Sq. Yd.		
	1st Year	2nd Year	Subsequent Years
1st treatment	⅝	⅛	¼
2nd treatment	⅜	⅛	¼
Total	1	¼	½

On heavily shaded roads these quantities may be reduced 25 per cent and on roads in the sun they should be increased 50 per cent. In 1942, 74 miles, or 41 per cent of the State Forest road system, were treated in spite of the fact that labor was scarce and that many roads which should have been cared for were not. Last year, as fast as labor was available, the more important roads were given their scraping and calcium-chloride treatment. Experience has shown no other work produces as satisfactory results for such a small expenditure of time and money.

Remember, every accident helps the Axis. Follow safety rules on the job and prevent accidents.

KEYSTONE PAVING JOINTS FOR EVERY JOB—TO FIT ANY BUDGET!





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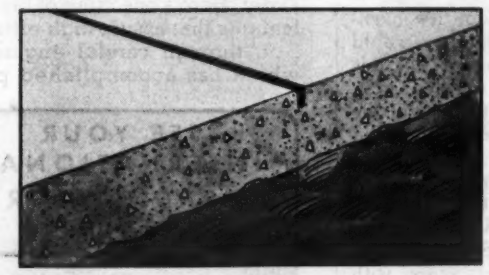

KEYSTONE DUMMY JOINTS—for the job where cost must be kept down—give accurate, straight alignments and eliminate use of expensive installing equipment.

You'll have no costly delays on the job due to shipments of various materials not arriving together if you standardize on Keystone paving joints and accessories. Keystone, a leading paving joint manufacturer, offers a complete line of equipment and nationally accepted joints to fit every budget and will save you time, money and inconvenience by making complete shipments from one source available to you.

Whenever you have a paving problem or question on materials, take advantage of Keystone's free technical and advisory service. There's no obligation.

AVAILABLE FOR PROMPT SHIPMENT—*a complete, nationally known and proven line of pre-moulded tongue and groove joints, dummy joints, asphalt joints, fibre joints and accessories, joint-sealing compounds and crack filler. Write for catalog and descriptive materials today.*

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A DIVISION OF AMERICAN-MARIETTA CO.

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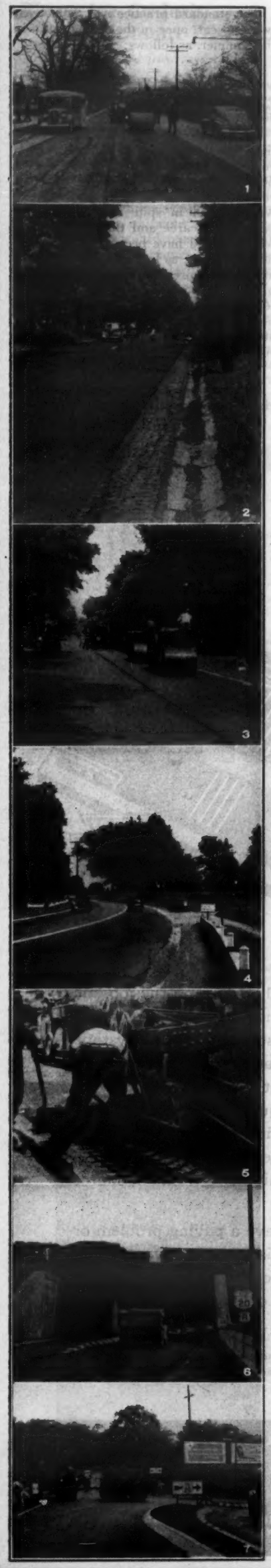
PREMOULDED ASPHALT AND FIBRE EXPANSION JOINTS AND ACCESSORIES
JOINT SEALING COMPOUNDS AND CRACK FILLERS



Resurfacing Project On Highway in Ohio

A 9-Mile Section of Old Pavement Is Improved to Stand Up Under Heavy Wartime Traffic

By M. S. FEIGLEY, Engineer, Cuyahoga Asphalt & Paving Co., Cleveland, Ohio

✦ WHILE we are engaged in the greatest war in our history, it is imperative that every effort be directed toward speeding victory so that lives may be saved, human suffering minimized, and the money cost held down to lighten as much as possible the financial burden which will be passed on to succeeding generations.

It is axiomatic that the matter of supply is an essential part of this all-out prosecution of the war. The closer one is to actual combat, the more the importance of supply is realized. To the man on the fighting front, supply is literally vital, but it is, of course, just as important where it originates, thousands of miles from the front. Our highways are more than ever carrying a large volume of this traffic of supplies, in some areas as much as 60 per cent. That these transportation arteries should be maintained so as to cause as little interference with this traffic as possible is the aim of our state highway departments.

How Ohio Does It

For the solution of this problem in Ohio, the Department of Highways is making wide use of its Type T-35 asphaltic concrete as a resurfacing over old brick, portland-cement concrete, bituminous, or other types of pavement. Where the old pavement is not very rough, this high-type surfacing is laid in two courses to a minimum thickness of 2 inches, and in three courses where the thickness of pavement necessary to take out the roughness is over 3 inches. With modern machine methods and rigid state highway department standards, a remarkably easy-riding road surface is obtained.

One lane is laid at a time, thus permitting the flow of traffic with very little interference. This practically overnight transformation of a rough old pavement into a smooth one is a real contribution toward keeping supplies moving to their ultimate destination, whether it be the fighting front or some training center, because the whole job is done in a fraction of the time necessary for new construction. At the same time, traffic is maintained with only minor inconvenience, where new construction would have required closing the road. There is thus a three-way economy effected: first, the economy of the continued use of the highway; second, a considerable conservation of man-power; and third, a real money saving over the cost of new construction. That this latter is not false economy is indicated by the fact that the life of the T-35 improvement is conservatively estimated at ten years, with little or no maintenance, and can be prolonged considerably by an occasional treatment. This estimate is based on the many miles of this type of pavement already in service from one to seven years.

Step-by-step pictures of asphalt resurfacing on U. S. 20 between Willoughby and Painesville, Ohio. 1. The asphalt "scratch coat" being laid and rolled over the center of the worn brick highway. 2. Leveling course laid to within 3 feet of the brick edge. 3. Rolling the Texaco asphalt wearing surface. 4. The completed project east of Willoughby. 5. The strike-off extension added to the Black Top Paver by the contractor. 6. The underpass looking south. 7. The view south from the underpass, showing the right-angle turn and the traffic island.

A Typical Project

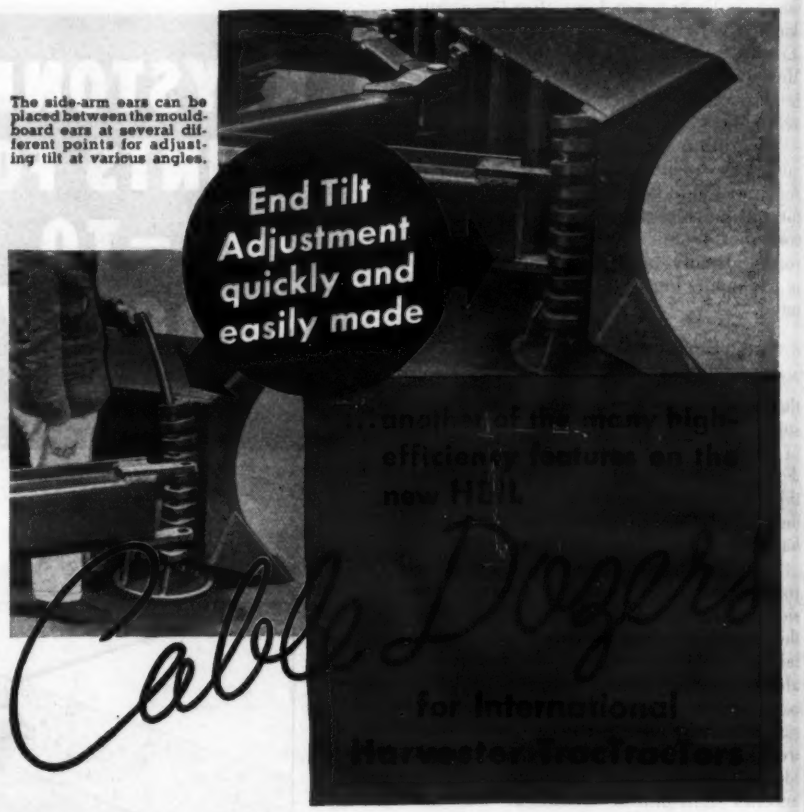
The resurfacing of U. S. 20 between Willoughby and Painesville, Ohio, is an excellent example of this type of work. Because of the urgency of the wartime transportation load of local heavy truck and bus traffic on this artery, there was additional need for the usual policy of maintaining traffic while the work was being carried on. A 3-mile section from Willoughby to Mentor was completed in 1942, and 6 miles from Mentor into Painesville was finished in July, 1943. The figures of 22,300 tons of T-35 asphalt mix, laid for the contract price of $160,000 for the two sections, indicate the magnitude of the job and its low cost. The total elapsed time on the two projects was only four months, including the usual weather delays. The average haul from the asphalt plant at Chardon to the work was 11 miles.

Operations

The following description of the work applies to both sections. The old pavement throughout most of the 9 miles was 36 feet wide, of repressed brick, with a shallow concrete gutter on each side serving as a header. This 36-foot width of brick was of variable crown because of subsequent widening from the original 18 and 20-foot widths. The cross section of the resurfacing gave a proper crown over the entire width. A number of bad curves, which were particularly hazardous where banking was the wrong way due to the old cross section and which had contributed to many serious accidents, were improved by super-elevation. This was done successfully with an Adnun Black-Top Paver by raising one side to lay a wedge course and placing as many lifts as needed.

The sequence of operations began with the placing of an extra leveling

(*Concluded on page* 41)


The side-arm ears can be placed between the mouldboard ears at several different points for adjusting tilt at various angles.
End Tilt Adjustment quickly and easily made
Cable Dozers
for International Harvester TracTractors

To establish a sloping cut . . . to peel a bank . . . to maintain a level cut when the tracks must travel on a slope . . . it's a simple matter to adjust the end tilt on the Heil Cable Dozer. Here's one more of the many features that assure high efficiency . . . through careful engineering which has accomplished perfect teamwork between tractor and dozer all along the line.

You can depend on Heil Cable Dozers to give you *positive* action . . . *smooth* performance . . . *full* visibility . . . and require *minimum* maintenance.

To get jobs done faster . . . and at a profit, investigate the possibilities of Heil Cable Dozers now.

Send for bulletin.

R-21

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Extra Work Turns Out Crusher as Memorial

An unusual story of patriotism comes from the Iowa Mfg. Co., of Cedar Rapids. As a memorial to a fellow worker, Louis M. Parks, missing in action since January 28, 1943, the more than one thousand men and women of Iowa Mfg. Co. built on their own donated time a complete 25-cubic yard rock-crushing and screening plant and presented it to the Government. Since the workers knew that the daily capacity of the company is one unit, on Sunday December 19, all were on hand and at the end of eight hours the job was done. As the Iowa Mfg. Co. is owned entirely by those working in it, and the time donated included that of both management and labor, the cost of materials as well as of fabrication was covered in the gift.

Plans for the project originated with the workers and were perfected under the direction of Chairman Ernest E. Fisher of the Iowa Mfg. Co.'s shop committee and Army engineers for the Rock Island Arsenal. The crushing and screening plant, bearing a plate designating it as "Louis M. Parks—Spirit of Cedar Rapids", was presented by one of the workers to Capt. Robert W. Scott who accepted it in behalf of Major-General Eugene Reybold, Chief of the U. S. Engineer Corps. The Army has promised to ship the unit immediately to some foreign theater of operations and to follow its record, reporting back to those who built it, in order that they may know the results of their efforts.

This type of rock-crushing and screening plant is used by the Army in all parts of the globe to aid Army operations and advances of our forces toward victory.

Christened "Louis M. Parks—Spirit of Cedar Rapids", this rock crushing and screening plant was built and presented to the U. S. Engineer Corps by Iowa Mfg. Co. employees as a memorial to a fellow worker reported missing in action.

Water Storage Starts In Shasta Reservoir

"The completion of the Shasta Dam and power plant is so important to the maintenance of an adequate supply of power and energy necessary to sustain the scheduled production of vital war materials that the Utilities Branch of the War Production Board has requested their completion at the earliest possible date and has reinforced that request continuously with high priorities for materials, labor, and equipment," is the opening paragraph of letters mailed recently by the Bureau of Reclamation to water users in the Sacramento Valley to announce that storage in the reservoir back of Shasta Dam would begin on January 1, 1944.

From January 1 to April 1 the river flow at Shasta Dam will be curtailed to an amount less than the usual flow of the river at this point during an average January 1 to April 1 period, but the quantity released will fulfill the estimated downstream requirements. The water stored behind Shasta Dam will be used later to supply the requirements of irrigation, navigation, domestic and industrial uses, and for the generation of hydro-electric power and energy.

Charles E. Carey, Regional Director of the Bureau of Reclamation in Sacramento, pointed out that waters stored now, when released from the reservoir during the late summer months, will hold the river flow above normal for that season of the year, and that, since the waters impounded will be those which normally caused floods, the upper river will no longer be able to pour a peak flow of 182,000 second-feet of water into an already swollen lower river as it did during the flood of February, 1940, causing the loss of nine lives and a damage estimated at $15,000,000.

Only Four Detours Remain On Indiana Highway System

The lowest number of detours in many years is now in existence on the 10,000 miles of state highway in Indiana, and these are expected to be opened by March 1, according to the State Highway Commission. Only four detours now remain on the list, three of them being caused by bridges being out, and the other is a detour for trucks over 10 tons gross.

Want a
DRY JOB?

NO WATER PROBLEMS — NO SHEETING — NO DELAY for the J. C. Truman Construction Co. of El Dorado, Kansas, on this difficult river crossing. A 24 inch gas line was firmly anchored and buried at depths of 10 to 32 feet. The Griffin Wellpoint System drained up to 9,000,000 Gallons per day permitting job progress in DRY excavation all around the clock. CALL GRIFFIN for these results on your next wet job.

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GRIFFIN ENGINEERING CORP.
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HAMMOND, INDIANA

SOUTH
GRIFFIN ENGINEERING CORP.
633 N. Myrtle Ave. • Jacksonville 5-4516
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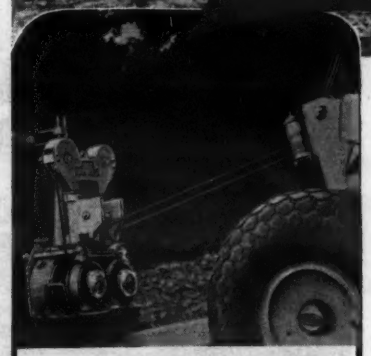
GRIFFIN WELLPOINT CORPORATION

You move more dirt per hour at less expense... with
HEIL CABLE SCRAPERS



CABLE POWER *Costs Less*

Simple, fast-operating Heil Power Control Units lower operating costs

Smooth-operating brake and clutch assemblies eliminate shocks and jerks; the large drums run cool; the sheaves are designed to reduce wear on cables. This adds up to minimum outlay for cable replacement. Fingertip control gives lightning-fast response for bigger yardage.

LOAD FASTER because of the rapid raising and lowering of the cutting bit, made possible by the fulcrum-type lift.

MORE YARDS OF DIRT with a given output of tractor horsepower, because the bowl fits the load without extra digging time.

ECONOMICAL HANDLING because the speed, flexibility, and scientific weight distribution assure bigger yardage at lower cost.

LESS CABLE REPLACEMENT because rope lasts up to four times as long. Many report savings of ¼¢ to ½¢ a yard.

FASTER UNLOADING—all the load can be spread smoothly and evenly at high speed — with no sticking in the bowl, even in wet, sticky soils.

...and that isn't all:

Heil engineering gives you all-welded construction; scientifically located draft-pivot point; ample tire clearance; and an all around design that assures you of easier maintenance and simpler field repairs.

Write for descriptive bulletins. R-22

ARMY E NAVY
THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Okla. County Improves Roads to War Plants

(*Continued from page 9*)

and permit setting the curb forms. The 1:2:4 concrete, with 6 sacks of cement per cubic yard, was poured direct from truck mixers into the forms. Dolese Brothers Co. furnished the concrete, hauling it an average of 12 miles from the company's Oklahoma City plant to the East Reno project. Pre-moulded expansion joints were placed every 45 feet, and dummy expansion joints every 15 feet. The concrete curb was poured at the rate of about 3,000 feet per day.

Gravel Base

The gravel for the base of the road was supplied by Midwest Materials & Construction Co., of Oklahoma City, for $1.58 per ton F.O.B. Oklahoma City. It was obtained from pits near Maud in Pottawatomie County, Okla., about 70 miles southeast of Oklahoma City. The gravel used by the county in these projects conforms to the following sieve specifications:

Passing	Per Cent
1½-inch sieve	100
¾-inch sieve	75 to 100
⅜-inch sieve	65 to 90
⅛-inch sieve	45 to 85
No. 4 sieve	35 to 75
No. 10 sieve	25 to 55
No. 40 sieve	15 to 35
200-mesh	6 to 15

The gravel base on the 1-mile dirt-grade section of the East Reno highway, as well as on other county highways with dirt grades, averages 8 inches thick. Before the gravel base was laid, these dirt sections were brought to grade by spreading gravel and compacting with Buffalo-Springfield tandem rollers. From 4 to 4½ inches of gravel was spread over the old asphalt pavement. The gravel was delivered by trucks which dumped it in piles on the pavement. It was then spread evenly between the curbs by a motor grader and sprinkled with water from a 3,000-gallon tank mounted on an International truck. The truck was equipped with a 350-gallon-per-minute water pump with a suction hose so that water could be obtained from the creek or pool which was nearest to the particular operations. No fixed quantities of water were used, but the amount of sprinkling varied according to the temperature and rate of evaporation. This gravel base was compacted by 8-ton Buffalo-Springfield tandem rollers.

The Rock-Asphalt Surface

Two inches of rock asphalt was laid cold in two 9-foot strips over the gravel base by a 12-foot Jaeger spreader which pulled a spike-tooth harrow to break up the surface lumps. Following the harrow were two men with lutes and a raker. The average crew for laying one mile of rock-asphalt surface per day consisted of nine men which included the luters and raker, two men on the dump truck, one man on the Buffalo-Springfield tandem roller and one on the pneumatic roller which followed, and two men on the spreader.

The rock asphalt used on these county access highways was furnished by the Southern Rock Asphalt Co., of Sulphur and Oklahoma City, Okla. The price to the county was $5.25 per ton, F.O.B. Oklahoma City, delivered 115 miles by rail to a siding near the job. The material used is a blend of natural limestone rock asphalt and natural sandstone rock asphalt, and is laid cold, without the addition of any flux or asphalt, after it has been crushed to pass a ½-inch screen. The asphalt was shipped in gondola cars at the average rate of ten carloads per day at the peak of construction. The material was unloaded from the cars by a Speeder crane with a ½-yard clamshell into trucks or to a stockpile. A Northwest crane with a ¾-yard clamshell bucket picked up the asphalt from the stockpile and loaded it into 4-ton Ford, Chevrolet and Dodge trucks, twelve of which hauled to the spreader at the peak of operations.

Personnel

There was little rain during the summer when most of the construction was proceeding on East Reno, East Ash, and North Eastern Avenues. C. W. McFerron, County Engineer, who also was consulting engineer on the county bond issue highway construction, said that no difficulties were encountered in securing skilled and common labor. The workers were drawn from the regular county highway construction force which numbered about 150 men.

R. L. Peebly is Chairman, and Mike Donnelley and Grover Pendleton are members of the Oklahoma County Board of Commissioners. A. E. Lytle was Resident Engineer for the county and C. S. Lewis, in charge for Lewis & Co., the curbing contractor.

An 8-ton Buffalo-Springfield tandem roller compacted the asphalt surface of an Oklahoma County access road.

O-K to LAND

"O.K. to land" says the control tower and this PAA Strato-Clipper glides in to a smooth landing. The fully-equipped terminal and level paved runways of this Latin American airport were mere engineer blueprints not long ago.

This is but one of scores of airports on the globe-girdling routes of Pan American Airways built from scratch or vastly enlarged as the demands of war stepped up the tempo of air transport. They were hacked out of jungle, built on filled-in swamp and sandy ocean isles, using modern construction equipment. Barber-Greene Finishers substituted level runways for corduroy roads, for wind-blown sand, for feverish swamp. In YOUR planning, get complete Barber-Greene information first. 44-2

Above: B-G Tamping-Leveling Finisher for building runways or streets—Fast and right.

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CONTINENTAL RUBBER WORKS
ERIE PENNSYLVANIA U.S.A.

How One Contractor Organizes for Safety

Austin Co. Believes That Safety Must Be Planned Into Job; Superintendent Is Important Factor

FROM the day the first layout stake is driven until a satisfied owner bids goodbye to the last man on the job, The Austin Co. of Cleveland, Ohio, looks to its superintendent for results, and counts on him for *safety* in construction, just as much as it does for speed, economy, and quality of performance. As the company's general manager on the job, the superintendent lines up the construction equipment, organizes the work, and determines the construction procedure. In his decisions, the basic importance of safety is always before him. He has a pretty free hand in setting up the job to get results, and knows at the outset that the company cannot accept excuses for needless accidents—and 90 per cent of all construction accidents are needless.

From the statements submitted by Austin superintendents who collaborated in the preparation of a very interesting and helpful booklet "The Austin Safety Method", it is evident that they put safety in top position in every job program, realizing that in nine cases out of ten it is squarely up to them to put and keep it out in front. The superintendents recognize a fourfold responsibility for safety: first, to the owner who expects Austin men to work as safely as his own; second, to the company whose policies on safety are in his hands; third, to his foremen who are his lieutenants in spreading the gospel of safety; and fourth, to the men on the job who expect him to enforce safety for their protection.

Goals and Policies

Ever since The Austin Co. was organized, it has been headed by men who believed that construction can be carried on safely. Today, as always, the President of the company heads up the safety program. He sets the goals and establishes the policies which obtain recognition of the need for accident prevention throughout the organization.

As he travels from project to project, he scrutinizes first-aid set-ups and is quick to spot avoidable hazards or questionable construction practices. Each month he receives a complete accident report from every district and a company-wide summary of performance.

Ideas and Insurance

The Treasurer of the company coordinates Austin safety activities from coast to coast. As the individual responsible for handling all of the company's insurance, he gets immediate reports on all serious accidents and a detailed record of accident experience monthly from every job.

Always on the lookout for ways of advancing safety in the field, the Treasurer keeps in close touch with national accident-prevention work. His biweekly safety letters to all superintendents and the Austin safety signs point up ideas from these sources with an aim to keeping safety always in the forefront of Austin thinking on the job.

District Managers' Responsibility

The company expects each district manager to see that the jobs in his district are set up to carry out Austin safety objectives 100 per cent. It is his responsibility to see that the job gets the kind of equipment which insures safe construction and adequate emergency first-aid facilities to care for workers promptly when unavoidable accidents do occur.

In selling safety to his superintendents, the district manager often lifts the whole spirit on a job to a point which recently moved one man to write: "You don't know how much your personal visits of inspection, your encouragement and your letters of constructive criticism on safety have contributed to performance all around the job."

(Continued on page 50)

WASTED MANPOWER...Daily Accidents
SAT. SUN. MON. TUE. WED. THU. FRI. TOTAL
100-200 BLOCK 0 0 0 1 1 2 0 4
300-500-600 BLOCK 6 0 3 5 10 3 7 34
800 BLOCK 19 3 6 6 10 7 11 62
1000 BLOCK 1 0 5 3 6 4 2 21
BY TRADES
LABORERS 6 0 2 3 9 6 4 30
CARPENTERS 2 0 3 1 5 3 4 18
PAINTERS 2 0 0 1 1 0 0 4
ELECTRICIANS 3 1 0 3 2 1 3 13
IRON WORKERS 5 1 3 6 3 1 4 23
PIPE FITTERS 4 1 2 0 4 3 5 19
BRICK MASONS 5 0 2 1 3 1 1 13
MILLWRIGHTS 0 0 0 1 2 1 3 7
BULLETIN
BEST WEEK YET!
2302 MAN HOUR
PER ACCIDENT
LET'S GO OVER THE TOP THIS WEEK

An Austin Co. Accident Record Bulletin Board appeals to the competitive spirit of workers to reduce accidents on the job.

10-S MIXER
THIS MACHINE COMPLIES WITH A.G.C. STANDARDS
IT IS GUARANTEED TO HOLD AND PROPERLY MIX 10 CUBIC FEET OF CONCRETE PLUS 10% WHEN OPERATING ON THE LEVEL

"Here's the secret of my success"

SURE I get my fair share of business. Certainly my estimates are accurate and my time schedule "right on the nose." And it's all because my concrete mixers and pavers have that certain something that spells reliability in action and guaranteed capacity—the A.G.C. Rating Plate.

I know that when I estimate a job I can depend, *to the last yard,* on the capacity and performance of my mixers and pavers. I know what they can do and just how fast they can do it. That means something in these days of "get it done yesterday" schedules.

When I'm in the market for a mixer or a paver, you can just bet that it's got to have that A.G.C. Rating Plate.

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Affiliated with the Associated General Contractors of America, Inc.

Chain Belt Company, Milwaukee, Wis.
Construction Mach. Co., Waterloo, Iowa
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The Lakewood Eng. Co., Columbus, Ohio
The Foote Co., Inc., Nunda, N. Y.
The Jaeger Machine Co., Columbus, Ohio
The T. L. Smith Company, Milwaukee, Wis.
The Knickerbocker Co., Jackson, Mich.

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—HAYCO—

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Hayward Buckets

AASHO Appoints Hale New Executive Secretary

Hal H. Hale, well-known in highway circles, has assumed the duties of Executive Secretary of the American Association of State Highway Officials at its Washington, D. C., headquarters. Mr. Hale, a native of Morristown, Tenn., has most recently been Washington representative of the American Society of Civil Engineers. Prior to that he was Office Engineer in the regional headquarters of the Portland Cement Association at Atlanta, Ga., and earlier served the city of Knoxville, Tenn., in various engineering capacities, having become Chief Engineer in 1933.

Mr. Hale succeeds W. C. Markham, who retired two years ago. In the interim, Miss Helen Whitaker has served as Acting Executive Secretary of the Association.

New Plant Completed For Robert H. Clark Co.

Announcement has been made by the Robert H. Clark Co., formerly located in Los Angeles, Calif., of the completion of a new plant at 9330 Santa Monica Blvd., Beverly Hills, Calif., where the company will have greatly increased facilities for the production of Clark adjustable cutting tools and the Clark automatic tapping-machine conversion unit. The new plant, located on a site of more than 50,000 square feet, with railroad siding, will house manufacturing and service departments, tool development and research laboratories, and the executive and administrative offices.

The Tool Division, for which the new plant was acquired, was originally organized to serve as subcontractor for West Coast aircraft plants. During the past two years, however, the company has developed a line of machine-shop tools which, though now limited to those holding high priorities, will be available after the war for modernizing and rehabilitating contractors' and state and county highway department service and repair shops.

Eaton of du Pont Dies

Harry B. Eaton, former Manager of the Construction Division, E. I. du Pont de Nemours & Co., Wilmington, Dela., died recently at the age of 59 years. Mr. Eaton, who had been associated with the du Pont company since 1911, was Manager of the Construction Division of the Engineering Department up until two years ago and, at the time of his death, was Consultant on Construction for the Department.

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DISTRICT OF COLUMBIA
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Jacksonville — Florida Equipment Co.
Miami — Florida Equipment Company
Tampa — Epperson & Company
Birmingham, Ala. —
Standard Construction Supply Co.
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Spokane, Wash. — Empire Equip. Co.
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Davenport, Ia. — Gamble-Robinson Co.
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Columbus, Ohio — W. W. Williams Co.
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New Orleans — Southern States Equip. Co.
MAINE
Portland — Stanley-Cothran Company
MARYLAND
Baltimore — Henry H. Meyer Co., Inc.
Washington, D. C. — Matt A. Dostech Machinery Co.
MASSACHUSETTS
Boston — The Equipment Company
New Haven, Conn. — W. I. Clark Co.
MICHIGAN
Detroit — Wm. P. Favorite Company
Grand Rapids — Contractors Mach. Co.
Iron Mountain — Service & Supply Division of Lakeshore Engineering Co.
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Omaha — Anderson Equipment Co.
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NEW YORK
Albany — Larkin Equipment Co.
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Elmira — LaVake, McLeod & Kinkaid
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Rochester — Keystone Builders Supply
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Salisbury — Carolina Tractor & Equip. Co.
NORTH DAKOTA
Fargo — Dakota Tractor & Equipment Co.
OHIO
Cleveland — H. P. Falter Equipment Co.
Columbus — W. W. Williams Co.
Pittsburgh, Pa. — Dravo-Doyle Company
OKLAHOMA
Oklahoma City — Leland Equipment Co.
OREGON
Portland — Contractors Equipment Corp.
PENNSYLVANIA
Philadelphia — Giles & Ransome
Pittsburgh — Dravo-Doyle Company
RHODE ISLAND
Boston, Mass. — The Equipment Co.
SOUTH CAROLINA
Columbia — Joel Hunt Road Machinery Co.
SOUTH DAKOTA
Rapid City — I. D. Evans Equip. Co.
TENNESSEE
Chattanooga — Nixon-Hamelle Co.
Knoxville — Wilson-Wooten Williams Co.
Memphis — Wilson-Wooten Williams Co.
Nashville — Wilson-Wooten Williams Co.
TEXAS
Dallas — Cowles Lott-Hodgkiss Mach. Co.
Houston — R. S. Sweett & Co.
UTAH
Salt Lake City — Lund Machinery Co.
VERMONT
Barre, Cassilini-Venable Corp.
VIRGINIA
Roanoke — Roanoke Tractor & Equip. Co.
Richmond, Va. — Henry H. Meyer Co.
Washington, D. C. — Matt A. Dostech Machinery Co.
WASHINGTON
Seattle — L. A. Young Company
Spokane — Empire Equipment Company
WEST VIRGINIA
Charleston — Charleston Tractor & Equip. Corp.
Pittsburgh, Pa. — Dravo-Doyle Company
WISCONSIN
Milwaukee — Hunter Tractor & Mach. Co.
WYOMING
Billings, Mont. — Western Construction Equipment Co.
Denver, Colo. — Ray Conner Mach. Co.
Salt Lake City, Utah — Lund Mach. Co.
CANADA
Halifax, N. S. — Coleman Mach. Co., Ltd.
Montreal — Watson Jack & Co., Ltd.
Regina, Saskatchewan — R. I. Fyfe, Ltd.
St. Johns, N. F. — Dominion Dist. Co.
Toronto — W. L. Ballentine Co.
Vancouver, B.C. — Wm. Equip. Co., Ltd.
Winnipeg — Mumford, Moodland, Ltd.

. . . for High Speed

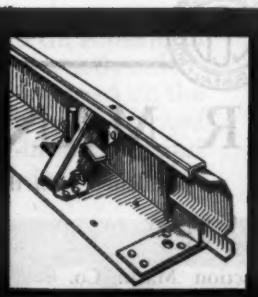
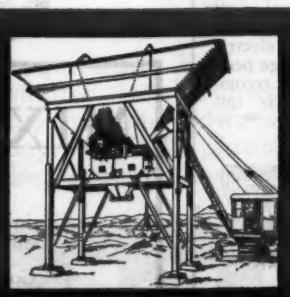
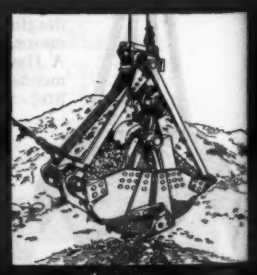
ON ROADS AND AIRPORTS
USE THE BLAW-KNOX
TRANSVERSE BLADE AUTOMATIC CONCRETE PAVING SPREADER
AND THE
BLAW-KNOX FINISHING MACHINE
(EITHER MACHINE EQUIPPED WITH PAVING VIBRATOR IF DESIRED)

● Contractors prefer the Blaw-Knox Transverse Blade Spreader because of its enormous capacity for spreading concrete ahead of the finishing machine — its automatic spreading action regardless of where the concrete is placed on the subgrade — the absence of pressure on the side forms and avoidance of disturbing form alignment — freedom from job-interrupting breakdowns and excessive maintenance costs — does not segregate concrete regardless of maximum size of aggregate — narrow machines are convertible to wider machines and vice-versa.

● Contractors also prefer the Blaw-Knox Finishing Machine because of the smooth finish obtained under maximum production conditions — wide screed ends prevent wastage of concrete over side forms — six traction speeds and four screed speeds for flexibility of operation to handle varying types of concrete — machine is easily and quickly adjustable for width — proper weight distribution makes machine easy on the side forms and easy to steer — low upkeep cost — easy to operate.

● The combination of the Blaw-Knox Finishing Machine and Transverse Blade Spreader has the capacity to handle the maximum output of two 34-E Dual Drum Pavers.

● See your nearest Blaw-Knox distributor about Blaw-Knox Finishing Machines and Blaw-Knox Transverse Blade Automatic Concrete Paving Spreaders for your next paving job.

LeTourneau Ads "Sell" Highway Work to Public

A series of post-war public-relations newspaper advertisements, to inform the public what a national program of highway construction will mean in terms of post-war work and prosperity to the residents of Peoria, is being presented to its employees, shareholders, affiliated industries and local residents by R. G. LeTourneau, Inc. The first of these, which appeared last November, was entitled "How a $70,000,000 Highway Program in California Helps Peoria" and explained how such a program, which would involve some of the widely used Peoria-built road-construction equipment, would redound to the benefit of those living and working in Peoria, even though the project itself is located many miles away.

The current ad in this series, "How Peoria-Built Equipment Stretches Your Highway Dollar", outlines the drop in highway grading costs as a result of modern earth-moving equipment, points out how much more highway the people of this country now get for their money, and urges the taxpayers to "plug" for a sound post-war road construction program.

This series of advertisements is an example of how the highway industry itself can help to educate the public on the importance and benefits to them resulting from a well-prepared economically planned program of post-war road work, to be ready when the opportunity for such construction arises.

English Roads Deteriorating

Lack of proper maintenance due to labor shortages is reported to be resulting in the rapid deterioration of many roads in England, according to a recent issue of *Highway Highlights*. It is planned to use Italian prisoners of war to carry on maintenance activities in order to keep essential roads in repair.

Turnbuckles With Fittings

A new illustrated folder has been released by Richmond Screw Anchor Co., Inc., 816-838 Liberty Ave., Brooklyn, N. Y., covering both the pressed-steel type and nut wire type of Richmond turnbuckles. The pressed-steel type is made in sizes from ½ to 1-inch inclusive and the same sizes are available in the nut wire type, as well as ¼ to ⅜-inch.

The bulletin referred to has extensive tensile-test information on both types, with illustrations, and contains a table of prices. Copies of this bulletin will be sent promptly to those writing direct to the manufacturer.

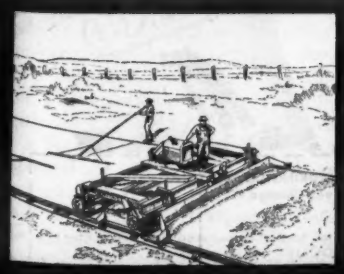
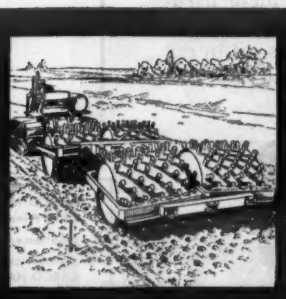
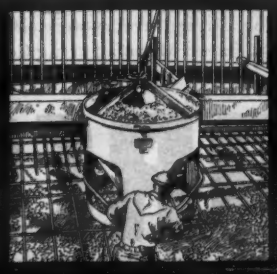
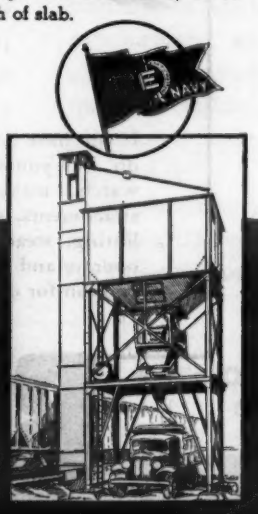
ed Quality Paving Production

The Blaw-Knox Transverse Blade Automatic Concrete Spreader and the Blaw-Knox Finishing Machine illustrated are paving the Queens Highway — the main east and west route in Ontario, Canada. The old pavement had disintegrated under heavy war traffic. Both machines are adjustable from 20 to 25 ft. widths. Photo shows paving operations on super elevated curve, 22 ft. width of slab.

- Pick for your job the machines that have made good on the world's toughest proving grounds, paving air bases and roads for the armed forces on every front.
- New points in design and construction, war inspired, will be found in the Blaw-Knox construction equipment you'll be using for post-war construction.

BLAW-KNOX

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY
2067 Farmers Bank Bldg., Pittsburgh, Pa.
NEW YORK • CHICAGO • PHILADELPHIA
BIRMINGHAM • WASHINGTON
Representatives in Principal Cities

Georgia Owns Sawmill For Wood Bridge Work

(*Continued from page 2*)

The aggregate taken from this land and the income from the sale of timber rights for one year more than paid for the original cost of the 500-acre tract. Only the largest timber was cut during that year and, in the ten years since, much pine stock has grown to sufficient size to produce most sizes of bridge timber required for maintenance purposes. The sizes of lumber most used are 10 x 12 for caps, 4 x 15 for stringers, 4 x 6 and 4 x 8 for hub guards, 3 x 10 for decking and 4 x 4 for sign posts, most of which can be produced easily and economically from this state-owned land by a recently installed sawmill.

The Sawmill

The sawmill was acquired from the State Park Commission in trade for a motor truck, involving merely the transfer of equipment between two state departments without monetary outlay. The sawmill consists of a carriage operating on a short length of industrial track for carrying the logs to the saw, a 48-inch Atkins circular saw driven by an International engine through a Goodyear Klingtite red belt. The engine and drive pulleys are 30 feet center to center, requiring the 8-inch belt to be slightly more than 62 feet in length.

The logs are delivered by the logging crew to a storage ramp from which they are moved onto the carriage by laborers and the log turner. The full sawmill crew consists of the head block feeder, a log turner, the sawyer, who is in charge, and two laborers who help move the logs and run out the timber on three well-spaced roller conveyors dumping the slash on one side and the dimension timber on the other. Racks are being built to store the timber, according to dimensions, for drying for a minimum of one week, or thirty days when the lumber is to be treated.

Logging

A logging crew of two log sawyers and one teamster with two or three mules is doing all of the cutting and hauling of the timber to the sawmill. It was at first thought that a tractor might be used for this purpose but in much of the area the trees have grown too close together to permit operation of a tractor.

The present 500-acre tract is expected to produce between 300 and 400 MBM which will take care of part of the bridge maintenance for several years. However, plans are being made to buy the timber rights on nearby tracts so that they can be alternated with the state-owned tract which can be cut over every ten years because of the rapid growth of the pines in this area.

Savings Effected

The cost of the logging and sawmill crews averages about $40.00 a day, while the production runs between 4 and 6 MBM per day and averages around 5. When it is considered that the present price of small timber is around $55.00 MBM and runs as high as $80.00 for the larger dimensions and up to $100.00 for timber with 75 per cent heart content, it will readily be seen that the operation will effect great economy in bridge maintenance in Division 5 which, at present, is the only Division operating its own sawmill for bridge timber. The operating costs are divided approximately $7.00 per MBM for sawing, $6.00 for logging, and $6.00 for hauling.

In Division 5, there are ten bridges, having a total length of 6,000 feet, providing the various crossings of the Altamaha River and its sloughs at Doctortown. These bridges alone require about 300 MBM annually to make the necessary repairs, and to take care of strengthening by the insertions of additional stringers. Normal maintenance costs about $20,000 per year but under present increased prices, this figure would be greatly increased were it not for the saving in the production of timber from state land by state forces.

Personnel

D. D. Hankins is Division Engineer, Division 5, State Highway Board of Georgia, with L. R. Phillips, Bridge Foreman and Patrolman, in charge of the maintenance of the Altamaha River bridges and the sawmill operation.

New Metallizing Booklet

A new booklet, Catalog 42B, recently issued by the Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y., describes Metco metallizing guns, wires, surface preparing tools, and other metallizing accessories in detail, as well as telling how sprayed metal coatings are saving critical materials and man-power in the production and maintenance of war-needed parts and equipment. Copies of this catalog may be secured free on request.

This company is also offering a limited number of copies of its 80-page Metallizing Handbook to present and potential users of the metallizing process. Profusely illustrated with photographs and diagrams, this Handbook covers every phase of the process, from surface preparation to spraying techniques and the finishing of sprayed metal coatings. Its price is $1.00.

AMERICAN WHEELBARROWS

Write for Bulletin

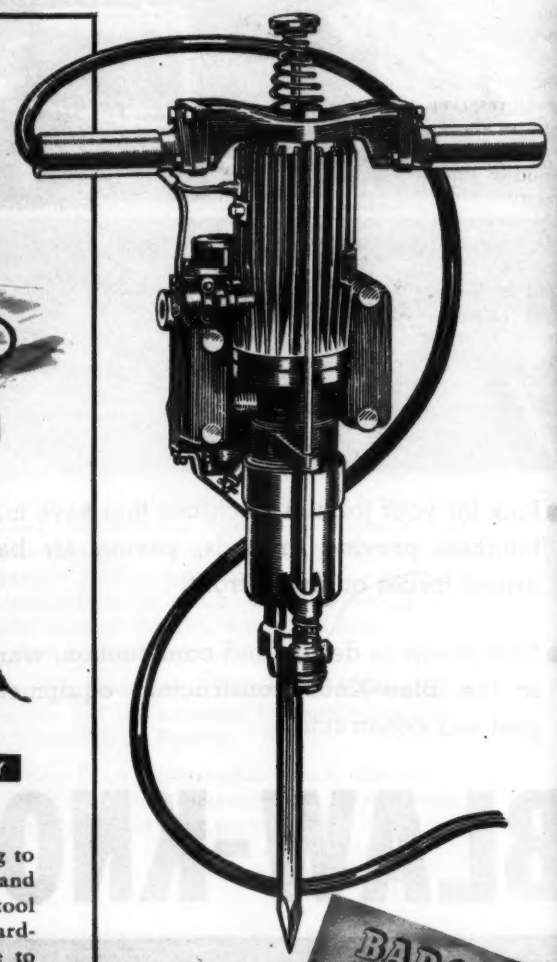
With Steel Wheel for WAR ORDERS

Barrow shown is the American No. 1—4 cu. ft. struck capacity Deluxe Concrete Wheelbarrow available with steel wheel.

Code with steel wheel.....PERFECT-S

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

HOW TO MAKE TOUGH JOBS EASY!



If you have any drilling, digging, breaking, or tamping to do, buy yourself a Barco Portable Gasoline Hammer and watch it make light of heavy jobs. With eleven special tool attachments, every job is made to order for these hard-hitting, steady-working lightweights. They cost little to operate and can be carried everywhere. Better send in the coupon for details. Barco Manufacturing Company, Not Inc.

BARCO

PORTABLE GASOLINE HAMMERS

Light in Weight Rugged in Construction

BARCO MANUFACTURING CO., NOT INC.
1818 Winnemac Ave., Chicago 40, Ill.

Gentlemen:

Without obligation on my part please send me a copy of the BARCO HAMMER BOOKLET.

Name_____

Street_____

City_____ State_____

Rosin-Treated Timber For Georgia Bridges

(*Continued from page 2*)

been built for storing new lumber during its period of air drying. After this, the ends are sawed off to provide pieces the proper length for bridge work and to save the loss of the wood preserver in treating wood which would be cut off later.

Vat Treatment

The treatment plant consists of a standard-gage track 350 feet long, at the center of which the 25-foot long x 4-foot wide concrete vat is located between the rails. A small hand car is used for bringing in the untreated lumber from the storage racks while a second car is used for loading the treated lumber and hauling it to another set of racks where it is stored until required for use on the bridges.

The vat is 6 feet deep and the wood preserver is poured into it to a depth of 3 feet before any lumber is placed in it for treatment. Enough additional wood preserver is then added just to cover the lumber. A gantry or frame, comprised of four piles spaced 9 x 18 feet on centers and with 10 x 12-inch caps, is provided to hold a 5-inch I-beam 14 feet long on which the tackle is rigged for raising and lowering the pile of lumber by means of a wire-rope sling and a wood capstan operated by hand on the tackle cable. When not in use, the vat is covered by a galvanized-iron roof.

About 19 or 20 pieces of 4 x 8-inch lumber, 20 feet long, are treated at a time. Hand-rail and 4 x 4-inch lumber require only four to six hours of immersion to permit the penetration of the wood preserver, while the largest timber requires about 12 hours. Sappy stringers are left over the week-end as a longer period of time is required for the wood preserver to work its way into lumber of this type.

One great advantage of this method of treatment is its safety. Men actually stand in the vat when there is only a small amount of the wood preserver present as it has no effect on their skin. This is quite different from creosote which causes bad blisters on any part of the body with which it comes in contact.

Personnel

The treatment vats in Division 5 are operated under the direction of D. D. Hankins, Division Engineer, State Highway Board of Georgia, with L. R. Phillips, Bridge Foreman and Patrolman, in charge.

Bathtubs and Irons But Few Spare Parts

The Office of War Information has announced that the curtailments of war production, based on data from the Navy, the Army, the War Production Board, and the U. S. Maritime Commission, will not permit any extensive returns to civilian manufacture during 1944, beyond the 2,000,000 electric irons and 50,000 bathtubs recently authorized by the War Production Board. WPB states, however, "Our severely burdened railway and motor transport systems and our heavy war industries must have first call on replacements and maintenance equipment as they become available".

A House Naval Affairs subcommittee reported on January 8, "the War Production Board has barred action to relieve this situation [transportation ills in the Puget Sound area of Washington] in an overemphasis on the manufacture of planes, tanks, ships, and armaments. Certainly the transportation system of this country is so vitally an integral part of our war machine that its proper maintenance contributes more to the final victory than will a few planes or tanks."

Two years of war strain on old equipment has made its replacement mandatory in all parts of the country and the committee points out that the shift to a stepped-up offensive in the Pacific could not be realized without adequate cross-country transportation.

The report, according to an Associated Press dispatch, puts some blame for the current situation on leaders of the transportation industry who, it said, have repelled attempts made prior to the war to get them to augment their rolling stock. The report further recommends a simplified method of obtaining necessary replacement parts to keep transportation facilities in service, double-tracking of rail lines, and widening and straightening of highways.

This is a belated recognition of the part that highways are playing in the transportation of war munitions. It is hoped that it will result in increased replacement parts for truck transportation units and for the equipment which maintains these highways and which should be used also in the construction of some improved highway facilities at once.

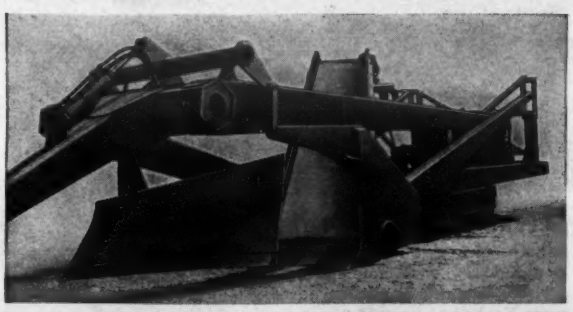
Twenty-Three Compounds To Protect Steel; Concrete

A new illustrated Bulletin No. 650 has been issued by Inertol Co., Inc., 470 Frelinghuysen Ave., Newark 5, N. J., which lists and describes in detail Inertol waterproofing and protective compounds for concrete and masonry surfaces and for iron, steel, and wood surfaces. The bulletin has a handy index from which one can pick out any particular type of work or operation and find the number referring to the Inertol product for that particular service.

Copies of this bulletin will be sent by the manufacturer on request to those mentioning this item.

MONDIE DROP and UPSET FORGINGS
FOR CONSTRUCTION EQUIPMENT
Such as Dipper Teeth, Trencher Teeth, Gear Blanks, Levers, Tie Rods, Cranks, Crank Shafts, Special Shapes, etc. Forging weight range from 1 to 50 pounds.
Inquiries given prompt attention by our Engineering Dept.
MONDIE FORGE COMPANY INC.
10299 Berea Road Cleveland 2, Ohio

Backed by more than a year and a half of exhaustive tests and actual production operation, this new earth moving tool has proved its ability to load dirt faster and cheaper. The Model BV EUCLID LOADER is built to match the speed, versatility and efficiency of other Euclid equipment. It will load loose sand, gravel, shale, muck, heavy clay and other materials at lower cost and in shorter travel distance than other types of mobile loading equipment.



The wide 54" carrier belt is powered by a 150 h.p. engine and has a peak capacity of one ton per second. Diagonal mounting of the conveyor and high clearance of the delivery chute makes possible the loading of large hauling units in cuts as narrow as 32 feet shoulder to shoulder. Unusually long belt life is achieved by an effective cleaning mechanism and complete belt protection along the edges and at the cutting blade — material being loaded slides up the cutting edge and onto the belt rather than striking against it.

Write us or your nearest Euclid distributor for descriptive literature and specifications on this efficient earth loading unit.

The EUCLID ROAD MACHINERY Co.
CLEVELAND, OHIO

EUCLID SELF-POWERED HAULING EQUIPMENT For EARTH ROCK COAL ORE

Drilling hard rock for blasting on a highway-widening project.

Cost of Rock Work With Compressed Air

The widening of mountain trails and roads to provide adequate highways for modern traffic has become an important item in highway construction in many of our mountainous states, and this type of work will abound in the post-war years.

Cost data prepared by the Compressed Air Institute on the use of pneumatic equipment on work of this type and in tunneling will be of interest to our readers. On one job approximately 25,000 cubic yards of solid rock was removed on a mountain trail where the terrain was extremely rough and much of the drilling for blasting had to be done with the drillers tied to trees along the mountainside. To drill all of the holes required for blasting, only slightly more than 3,000 hours of compressor operation was needed. A total of more than 50,000 feet of drilling was done in this time by pneumatic rock drills weighing less than 50 pounds each. The portable compressor, operating at 100-pounds pressure, consumed about $850 worth of gasoline, and oil valued at $125. The cost of labor was less than $5,000. Including all costs, repairs, fuel, labor, as well as incidentals and equipment depreciation, the drilling was done at a cost of about 12 cents per foot.

On another road-building job done with pneumatic equipment, it was necessary to remove over 40,000 cubic yards of solid rock. One of the cuts on this job was 65 feet high at the peak and 250 feet long, including a total of 4,229 cubic yards of hard gneiss rock. The drilling and blasting was completed in 26 days. Two portable air compressors of 210-cubic-foot capacity supplied the air for four rock drills. The down holes on this job averaged 12 feet deep, while the horizontal holes averaged 10 feet. A total of 4,680 feet of hole was drilled.

An interesting example of compressed-air economy and efficiency is given in the driving of a small tunnel, 4½ x 5 feet in cross section and 200 feet long, through an outcropping of solid granite. The work was done by an air-powered rock drill. Including labor, interest, overhead and depreciation, the cost of the work was only $14 per foot of tunnel as against previous experience on a like operation by hand methods at $32 per foot.

New Novo Sales Manager

The appointment of Deane K. Mitchell as Sales Manager, succeeding R. B. Harvey who resigned, has been announced by Novo Engine Co., Lansing, Mich. Mr. Mitchell has been a sales executive for nearly 25 years and joined Novo in April, 1937, as Manager of Export Sales. Prior to that, he was with the Niagara Sprayer & Chemical Co., Inc., of Middleport, N. Y., having been employed by them shortly after being mustered out of the 35th Aero Squadron, U. S. Army, in 1919.

As Export Manager, Mr. Mitchell made two trips to Mexico and in 193[illegible] made a complete survey of the Novo distributors in the West Indies, South and Central America. Since his return he has devoted an ever-increasing amount of time to the domestic sales.

Post-War Highway Program Planned by New Hampshire

An unprecedented post-war highway program, amounting to $30,000,000, is being planned by New Hampshire, anticipating that Federal funds will be available to assist in financing such a program. Although the State Highway Department engineering staff has been depleted during the war, work has already been started on blueprint details of numerous projects embraced by the program.

Among the proposed projects would be the construction of a limited-access highway across New Hampshire, linking Massachusetts and Maine.

PAVEMENT VIBRATORS

Three types: *Vibrating screed*, full-width, propelled by hand-operated winch and cable or pushed ahead by finishing machine. Gasoline power plant.

Tubular internal, extending entirely across slab, mounted in front of finisher. Gasoline or electric power plant with flexible shaft drive.

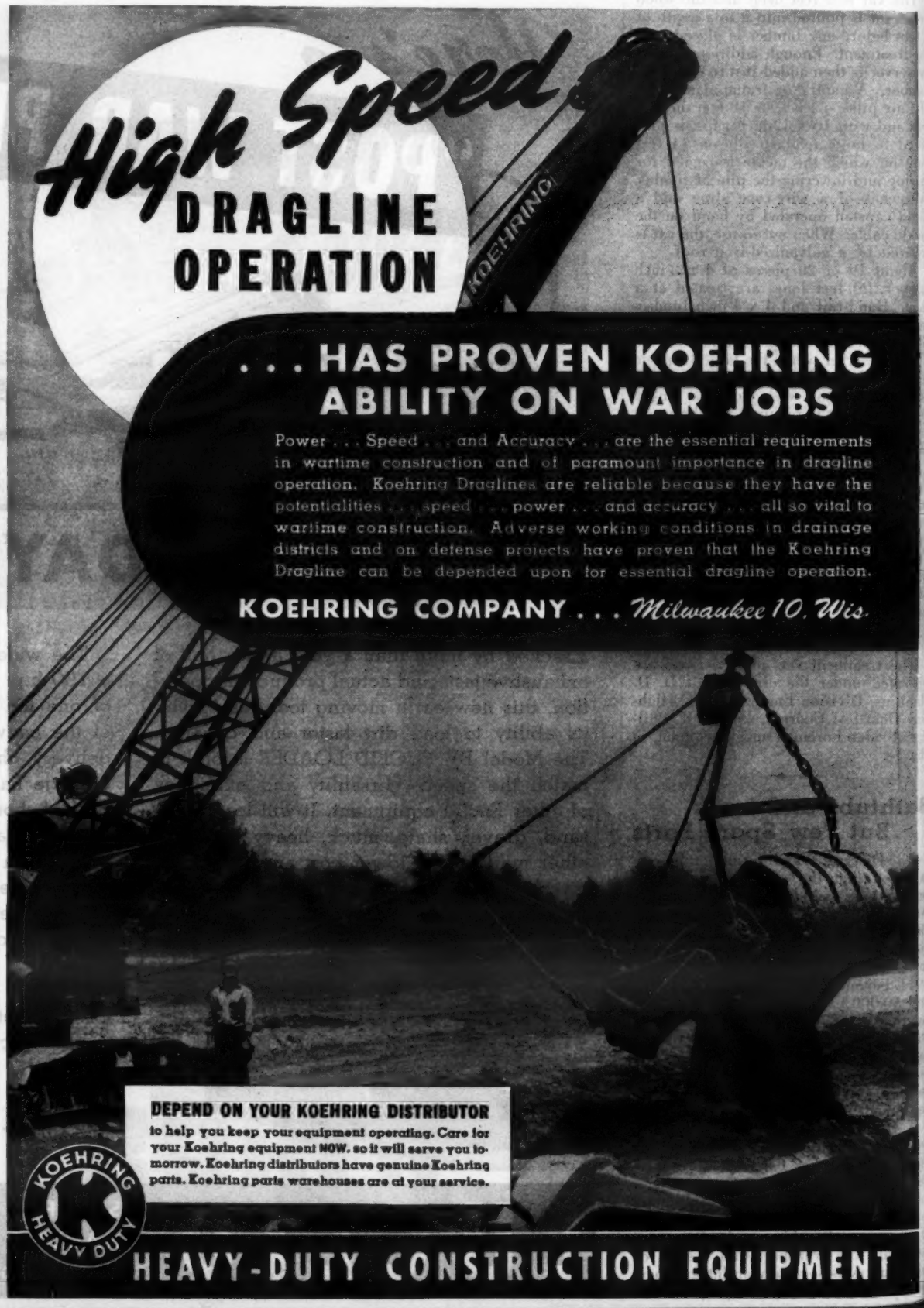
Vibrating pan, full-width, carried by two-wheeled trailer behind any standard finisher. Gasoline or electric power plant.

STRUCTURAL CONCRETE VIBRATORS

1, 3, and 4 H. P. gasoline, air-cooled, 4 cycle motors; flexible-shaft drive; interchangeable vibrator heads lubricated for life. Wheelbarrow carriers.

Pioneers in Concrete Vibrators

BAILY
VIBRATOR CO.
[illegible] WOOD STREET PHILADELPHIA, PA.


High Speed
DRAGLINE
OPERATION
KOEHRING
. . . HAS PROVEN KOEHRING
ABILITY ON WAR JOBS
Power . . . Speed . . . and Accuracy . . . are the essential requirements in wartime construction and of paramount importance in dragline operation. Koehring Draglines are reliable because they have the potentialities . . . speed . . . power . . . and accuracy . . . all so vital to wartime construction. Adverse working conditions in drainage districts and on defense projects have proven that the Koehring Dragline can be depended upon for essential dragline operation.
KOEHRING COMPANY . . . Milwaukee 10, Wis.
DEPEND ON YOUR KOEHRING DISTRIBUTOR
to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.
KOEHRING
HEAVY DUTY
HEAVY-DUTY CONSTRUCTION EQUIPMENT

Care in the Field Makes Cables Last

Operators Who Watch Their Machines, Not the One-Day Records, Hold the Monthly Records That Count

By R. P. DAY

THE tractor was stuck. No doubt about it. The front end of her crawler tracks were out of sight in the sticky mud. Her bulldozer blade, pulled as high as the winch would raise it, still rested its nose in the muck. Down underneath, her broad belly had come to rest on a flat rock, causing the tracks to spin hopelessly when the corporal slipped the master clutch. Temporarily, at least, No. 127 was out of the picture.

Someone suggested that a new International airport tractor in use nearby might help the situation. It was brought up, with a full drum of new cable on the winch, twelve layers of the finest 9/16-inch improved plow steel that money could buy. They lashed her rear end to a stump, ran off nearly all the top layer from the winch, and hooked on to the drawbar of No. 127. The International heaved and strained, the cable whipped up once, drew taut, and then under the strain the top wrap began to pull down *through* all the other layers on the drum. No. 127's diesel engine roared. Pigtails began to pop out all over the winch drum on the International. Finally No. 127 was free, but at the expense of 400 feet of utterly ruined new cable.

An inspection of the cable that afternoon and the next day when it had to be burned off the drum with a cutting torch pointed out a lesson in handling new cable. If the operator who installed that new cable on the winch had only known enough to put it on under sufficient strain to wrap it tight, the cable would never have pulled down through all those loose wraps on the drum.

Handling Wire Rope

Of all the abuse and wearing conditions to which a wire rope is subjected, perhaps the greatest intangible of all is the attitude and experience of the operators to whose care wire rope is entrusted. Much has been written on the subject. Wire-rope manufacturers publish and distribute free of charge interesting and helpful booklets to help the wire-rope purchaser get the service hours for which he pays.

But unless the operator in the field handles the rope correctly, under the proper operating conditions, it will be worn out far ahead of its time. That means costly premature rope-changing delay; if it happens overseas, it means that cargo space is overtaxed; it means that, because one man has been negligent, the man who pays for his time has been cheated out of many hours of rope service to which he is entitled; and it means the waste of a critical material vital to the war effort.

In these days, the operator who installs a new drag cable on the average 2-yard dragline is handling a precious material. If it is the new improved type many contractors now find most economical, it is the finest grade of improved plow steel, testing up to 140,000 pounds of tensile strength per square inch. The home-front operator who installs such a cable is literally taking under his care enough critical material to fabricate Garand rifles for a hundred soldiers.

How It Can Be Done

The operator of cable-equipped machines can do many definite things to get the most out of his steel, if he will. He can make sure that he handles the rope properly, unspooling it straight from the reel. He can be sure that his oiler lubricates the ropes with hot crater compound during the lunch hour, at least once each week.

So lubricating a rope will materially lengthen its working life. A wire rope is an intricate piece of equipment. A common 6 x 19 cable has 114 working parts, exclusive of its core. If it is a non-preformed rope, its wires were forced in place in the manufacturing process, setting up inner stresses which eventually cause wear. This can be somewhat alleviated by proper lubrication. In preformed wire rope, each individual wire is pre-shaped to the helical spiral it will be when it lies in place in the finished rope, and thus is more flexible and stands up longer where it encounters bending fatigue over sheaves. However, proper lubrication of preformed rope once each week will add as much as several hundred hours to its service life.

Once a month an operator should inspect his sheaves, checking the groove carefully for any wear or increase in radius. When all cable was non-preformed, sheave grooves were cut and burred badly as worn cables twisted and bit the grooves with its porcupined crown wires. Even badly worn preformed cable will not burr in this fashion as long as the sheave is of proper diameter and so installed in relation to the drum that no excessive fleet angle results, and sheave checking can be spaced out considerably if preformed wire rope is used all the time.

The initial breaking-in process for wire rope is very important. One dredge operator increased the average working life of his ladder hoist cable from 1,000 to 1,400 hours simply by having his whistle boy tap each wrap in place alongside its brother with a 6-pound sledge-hammer, while the new rope was wound on under a 5-ton strain. From that time

(*Concluded on page* 57)

Victory PARA-PLASTIC

Manufactured by SERVICISED to conform to Federal Spec. SS-F-336 and C.A.A. Spec. P-605, *Para-Plastic* is recognized in the concrete construction field as the one-time sealer for long-time service in Expansion and Dummy joints.

Pioneers in the manufacture of Approved Construction Materials for over twenty-three years.

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BUDA *Low Pressure* DIESELS

The low pressure design of BUDA Diesel engines greatly eases the load on starting motors . . . unique combustion chamber in BUDA Diesels, so thoroughly mixes the atomized fuel with the incoming air that this perfect combination furnishes complete combustion for quick, easy starting. This BUDA feature saves valuable starting time resulting in cash savings on every job.

ORDINARY DIESELS
High cylinder pressures produce sledge hammer blows that punish pistons, rods and crankshaft every power stroke.

BUDA Low-Pressure DIESELS
Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.

Remember . . .
• BUDA Powered means BETTER Powered
Specify BUDA engines on the equipment you buy.

BUDA
HARVEY (Chicago Suburb) ILLINOIS

Alabama Kilby Shops Handle Heavy Repairs

(*Continued from page* 12)

permanently installed at the end of the main shop.

The machine-shop section of the main shops is compact but very well equipped for the services needed. It has a Manley 25-ton hydraulic press, a planer, power hack saw, an emery wheel and buffer, a 16-inch x 3-foot Reed-Prentice metric lathe, a heavy-duty turret drill, a 16-inch Smith & Mills miller, a medium-size drill press, an Oster threading machine for bolts and pipe, a Van Norman piston grinder, a 6-inch x 3-foot South Bend lathe, another grinder, a 36-inch x 12-foot South Bend lathe, and a movable double A-frame with a 1½-ton Coffing hoist. Most of the drives in the machine shop are from jack shafts. The shop continues up this side of the building with nine additional repair stalls.

The Wood Shop

The wood shop is in a separate galvanized-iron building where desk, body, and other cabinet work is done. It has a Racine band saw, a rip saw table, a second band saw, a small planer, and other small equipment and hand tools required for wood-working jobs.

One section of this shop has a solid-tire press and a re-rigged old track press which is still doing excellent work. There is also a Rodgers portable track press out on the road. In addition, this building houses a shovel shop, where both large and small shovels are brought in for overhaul. It is equipped with a heavy-duty overhead hoist.

Other Features

A separate building 40 x 150 feet is used as a tractor and heavy-equipment repair shop. These larger units are torn down here and the parts requiring added work are taken to the machine and other shops for attention. This shop has a brake and clutch riveting machine and a wall crane spanning the shop from the center to the outside wall and running its entire length. It carries a 2-ton Yale triplex block.

The paint shop is in two parts, inside and outdoors, for equipment is painted within or outside the shop, depending on its size. The large heavy equipment is repainted outside the shop.

A grease rack located at the end of the main shop has a steel ramp and is equipped with a full Alemite pneumatic lubricating outfit. Adjacent to this is a new brick building containing the large acetylene generator from which the gas is piped to stations in all parts of the yard where it is needed.

Outside the shovel shop is a rail iron frame with a 5-ton hoist for unloading heavy material. The hoist is 30 feet above ground and has 30 feet of travel. Near here also is a rewinder for rotary brooms used so much in cleaning base courses before priming for surface treatment. Close by is a concrete unloading ramp at the end of a spur track, equipped with a pillar derrick with a boom that swings 360 degrees.

Salvage is an important activity at any shop, large or small, today. Here three bins are maintained for the reception of scrap from the main shop as well as from the division shops. There is one bin each for cast iron, steel, and light sheet iron. In the past eight months a total of $37,000 has been realized from the sale of scrap by the Alabama Highway Department.

Temporarily stored in the yard at the time of our visit was a carload of grader blades just received on a purchase order nearly a year old.

Personnel

The Kilby Shops of the Alabama Highway Department, G. R. Swift, State Highway Director, are operated under the direction of the State Superintendent of Equipment, J. J. Goddard, with J. O. Grant as Kilby Shop Superintendent.

A description of the Division 3 and Division 6 shops will appear in subsequent issues.

New Rubber Developments For Use in Post-War Era

The post-war possibilities of wartime developments in the rubber industry were outlined recently for district managers of the Goodyear Tire & Rubber Co.'s Mechanical Goods Division from the entire country. W. C. Winings, Manager of the Mechanical Goods Division, told the group that this war has been productive of advances in rubber technology which otherwise would have taken many years to accomplish.

Among the new developments are new types of conveyor belts for tapping hitherto inaccessible mineral and aggregate deposits, smaller power drives with higher efficiency, and high-pressure hose especially adapted to new sprays for trees. The use of conveyor belts instead of railroad transportation for coal, minerals, sand, and gravel will greatly decrease the cost of production and make possible the use of remote deposits, the cost of working which has been prohibitive in the past. Pointing to the ever greater acceptance of sprays with petroleum bases, certain to be accelerated still more when refineries turn from war to peace production, it was emphasized that synthetic rubber alone is suitable to handle these sprays. This is equally true of the handling of paint in paint spray units and of gasoline.

It was also predicted that war-developed power belts with steel-cable carcasses, already being used on the engines of tanks and other armored military vehicles, will lead the way to new types of power drives with smaller numbers of belts but with even greater potential energy possibilities.

Official U. S. Navy Photograph

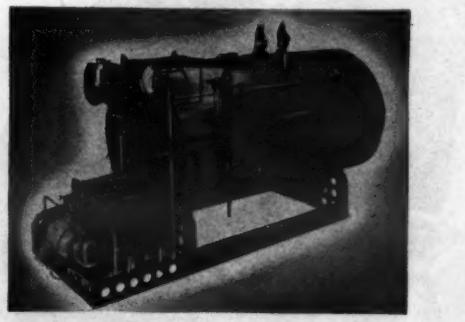
BEACH-HEAD ESTABLISHED! *Tanks Ashore!*

ONE of the most effective and startling types of ships the war has produced is the LST—Landing Ship-Tank.

Born of American ingenuity, these formidable and sea-worthy craft carry American fighting men, supplies, tanks, half-tracks and other mechanized equipment to enemy shores in all corners of the world — Attu, Rendova, Sicily, Kiska, Munda, New Guinea.

Conceived wholly for transport and combat, every inch of space aboard an LST is put to use. These ships cruise from tropic to frigid seas—where ample ship-heating facilities are indispensable. Because Cleaver-Brooks steam generators are exceedingly compact and highly efficient in use of fuel-oil, they are in service aboard LST's—providing necessary steam for heating as well as hot water for the galley and hygienic needs of the men on board. Factory "packaged," finished and tested in every detail — compact, space-saving design—high fuel-to-steam efficiency—quick steaming capacity — dependable 'round the clock performance — these advantages of Cleaver-Brooks steam generators *qualify* them for "combat" duty. Other Cleaver-Brooks equipment in action with our armed forces include portable water distilling units, sterilizers, disinfectors, tank-car heaters, bituminous boosters, and steam generators installed at bases at home and abroad.

Whatever your present or future need for efficient heat generaring and utilizing machines—steam generators, steam processing equipment, automatic steam plants, tank-car heaters, bituminous boosters—write us now for complete information in anticipation of the time when normal conditions return.

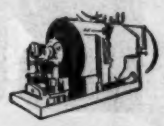


Official U. S. Navy Photograph

Cleaver-Brooks steam generator of the type used aboard LST's—for heating the ship—providing steam and hot water for the gallery and hygienic needs of the crew and military personnel.

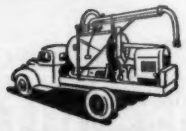
CLEAVER-BROOKS COMPANY
5110 North 33rd St., Milwaukee 9, Wisconsin

Cleaver-Brooks


Steam Generators

Food Processing Equipment

Tank Car Heaters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Special Military Equipment

PILE HAMMERS and EXTRACTORS

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Special Equipment
Movable Bridge Machinery

Write for descriptive catalogs

McKIERNAN-TERRY CORP.
19 Park Row, New York

Distributors in Principal Cities

One of the new Westinghouse airport contact lights which will withstand loads of 150,000 to 200,000 pounds.

Runway Marker Light Takes Heavier Loads

Contact or runway marker lights, placed in rows along the edges of airfield runways, must be able to withstand being run over by the wheels of fast-landing planes, and airplanes are becoming steadily heavier. A little more than a year ago Westinghouse engineers developed contact lights which would not crush under a pressure of 100,000 pounds. But during the past year heavier planes with crawler treads instead of rubber-tired wheels have appeared on the scene, and the combination of the increased weight and the crawler treads results in a blow which can crush the 100,000-pound units.

So, according to one Westinghouse designer, the engineers threw away previous conceptions of contact-light design and dusted off some old bridge-structure manuals. The result is a new unit with a steel cap supported on a steel spider. Between the fingers of the spider, the light rays stream almost parallel to the ground. The crushing load is carried downward at an angle to the steel ring resting against the concrete of the cell. These new units, with mild-steel spiders, have repeatedly withstood loads of 150,000 pounds, and with spiders of alloy steel, can withstand more than 200,000 pounds. These increases in strength have been achieved without any increase in size, as the units must fit into existing concrete emplacements.

Further information on these heavy-duty runway marker lights may be secured direct from the Lighting Division, Westinghouse Electric & Mfg. Co., Cleveland, Ohio, by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

Lumber Supplies Will Be Limited During 1944

Lumber has had two emergency jobs to do as its contribution to the war effort. The first is all but completed and the second has scarcely begun. So heavy will be military demands for lumber and other wood products in 1944 that there is no reason to believe that any substantial additional amounts of forest materials will be routed to domestic civilian uses in the coming year, according to the National Lumber Manufacturers Association.

Even before Pearl Harbor, the lumber-producing industry felt the impact of war when it was called upon to furnish the materials to create the basic U. S. military-training establishment. By the time this establishment was nearing completion, lumber inventories had virtually ceased to exist, as current production felt the pressure of increasing demand. As the military construction program passed its peak, there was still no let-up. With no time lag for creating new inventories, military operations, as contrasted with military training, taxed the industry even more heavily.

Through all this period, because many forest and mill workers had been drawn away by other war industries and by the military forces, adequate lumber production was confronted by such a serious man-power problem that, in 1943, with a labor deficiency of nearly 25 per cent, production declined in the face of an ascending curve of packaging and other requirements, the Association reports.

Because of the versatility of lumber, it has been directed to hundreds of war uses. During 1943, military boxing, crating and shipping used between 12,000,000,000 and 15,000,000,000 board feet of lumber. This is the largest military item, but other uses are on the increase too. During 1942, we produced in this country three times the wooden ships turned out in our yards in 1855, peak year of this country's sailing-ship construction.

The impact of war has brought lumber production to its highest peaks since 1929, despite serious man-power problems. More than 36,000,000,000 board-feet of lumber was produced in 1942. Production sagged somewhat in 1943, and in January, 1944, mill inventories dropped to little more than 4,500,000,000 board feet, as compared with 11,700,000,000 board feet in 1929. Consequently the outlook for 1944 does not indicate any increase in lumber for domestic use. That increase will come only when the enemy has been defeated, and lumber is no longer needed in huge quantities for military purposes.

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ARC WELDER

Gasoline-driven 300 ampere, and electric and motor-driven 200, 300 and 400 ampere welders available for 2-week delivery. Contain several features not found in more expensive welders. Send coupon for complete story.

Stationary type gasoline engine driven welders are complete as shown, ready for mounting on skids or your own portable chassis. Include heavy-gauge sheet metal housing, roomy storage cabinet that locks. Engines are equipped with battery ignition, battery, starting motor, charging generator. Automatic "slow down" brings engine up to speed when arc is struck, causes drop to idling speed when welding ceases.

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BY punching through deep snows at high speeds on the opening run, Walter Snow Fighters throw snow far to the side, instead of merely turning it over. This spreading action prevents the formation of the high, abrupt banks which slow down widening-out work.

The exclusive Walter Four-Point Positive Drive makes this high-speed performance possible by turning tremendous power into smooth, positive traction. Three automatic locking differentials proportion the torque to FOUR driving wheels according to the traction of each at any instant. Power is not wasted spinning wheels with least traction. If one wheel loses traction momentarily, its mates continue to operate under full power.

Other features which contribute to the all-around superiority of Walter Snow Fighters are Suspended Double Reduction Drive for greater gear capacity, reserve power, higher ground clearance and less unsprung weight — tractor type transmission — scientific weight distribution — and many others. Write for detailed literature.

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Highway Departments And Public Relations

The Need for Independent Public Relations Divisions Within Road Organizations Not Realized by Engineers

By C. W. LUCAS, Assistant to the President, Great Lakes Greyhound Lines; formerly Public Relations Director, Michigan Highway Department.

IT *should* be safe to assume that the highway organizations of this country are aware of the value of good public relations, but that is *not* a safe assumption. Nation-wide surveys over the past five or six years reveal that an infinitesimal amount of attention is given to public relations by most state highway organizations. The reason for this shortcoming undoubtedly is that the key personnel of these organizations are engineers, and engineers are notorious for their belief that "good work should always speak for itself". Their philosophy is praiseworthy insofar as they believe in doing good work, but it is not enough to do a good job alone . . . . . the public, or more specifically the taxpayers, in the case of a governmental agency, should *learn* about it.

Every highway department in the country is constantly facing critical problems that good public relations could help—problems that cannot be solved with a slide rule or cut and dried engineering specifications. Legislative appropriations, both state and federal, diversion of highway funds for other governmental purposes, and damaging laws that come out of every session of the legislature are but a few of these critical problems that every highway department must live with continuously. But few highway organizations get the full advantage of a favorable public opinion on these questions which could be obtained if highway administrators had their eyes open to the benefits of good public relations.

Essentials for Doing the Job

There are three points which should be emphasized, points that must be the basis of any satisfactory public-relations program.

First: Good performance is the bedrock of good public relations. The most important of all requirements for good public relations is first doing the job. No organization can hope to grow in public regard unless it does its job well. But doing a good job does not complete the requirement for possessing the favorable regard of the public.

Second: To doing a good job must be added the responsibility of telling about the job done.

Third: Responsibility for public-relations thinking and acting must be diffused throughout the organization. An organization comes to possess public respect not through the policy decisions of a few at the top alone, but through the cumulative efforts of all the people who make up an organization. No person in an organization is so small that what he does stops with himself. No sound company policy reaches full fruition unless it enlists the understanding, the acceptance, the enthusiasm of every man and woman in the organization. The load must be spread.

The Place of Public Relations

Some highway departments have attempted a public-relations program on a shoe-string basis. Such efforts fail and they deserve to fail. Most private businesses with a commodity to sell allocate somewhere between 1 and 5 per cent of the total operating budget to public relations, advertising and promotion.

We can assume that the average highway department in a normal peacetime year is a $50,000,000 business. If we take the low figure of one per cent which private enterprise earmarks for advertising and apply this to a state highway department budget, we would have $500,000 a year for public relations. Obviously this would be an excessive amount to devote to public relations in a state highway department. But one-fifth of this amount, $100,000, or even $50,000, would be a reasonable sum.

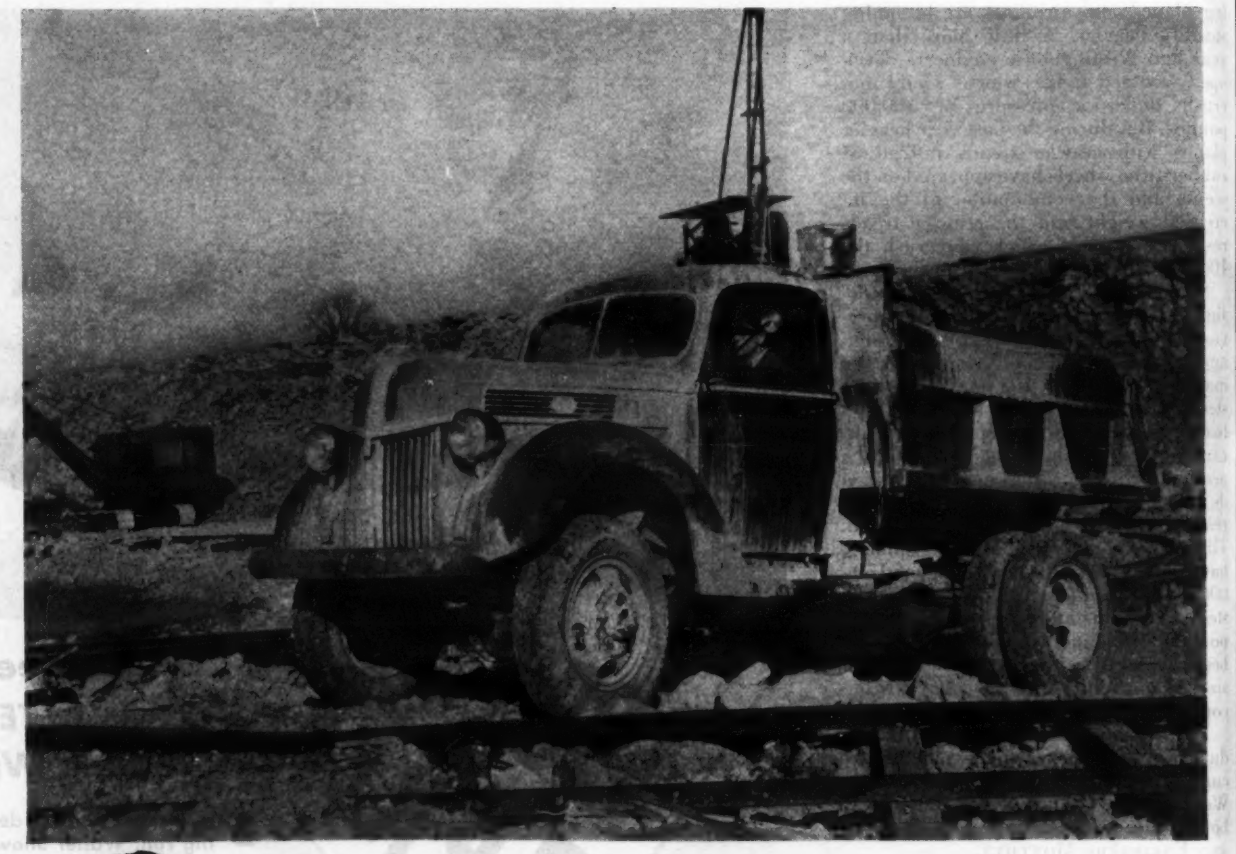
Given an adequate operating budget, the public relations division should have status in the organization on an equal level with other principal divisions of the department. Private business already has recognized this principle, as witness the General Motors Corp. which has a vice president who is also director of public relations.

The public relations division should have a voice in shaping departmental policy. The head of the division should be well informed on what is going on throughout the department. He should have access to the front office and should be called in on matters which may directly or indirectly affect the public.

Road, bridge, design or research engineers should realize that, just as they consult each other for expert advice on matters outside of their own special sphere, so should they consult the public relations division on matters which deal with the public. When a maintenance engineer, for example, issues to his men instructions that have some effect on the public, the maintenance engineer should first consult the public relations director.

One maintenance engineer hired an employee to deal with persons who were unlawfully encroaching on highway right-of-way with roadside stands. The employee who was to evict them told me that his job was to tell these trespassers "to get the hell off the highway property". After a brief discussion of

(*Continued on page* 54)



Owners Say These Are "THE PULLING-EST" Trucks They Ever Operated . . .

With the armies of our own and allied countries, and in the world's most difficult civilian services, Marmon-Herrington *All-Wheel-Drive* trucks have won the highest praise from the men who drive them.

Wherever the "going" is particularly tough, as in the oil fields, pits and quarries, logging camps, road building and road maintenance, etc., these trucks get the hardest jobs—*and eat them up!* They are especially adapted to the gruelling service of snow-removal, and for building and maintaining power, light, telephone and telegraph lines across country, in all kinds of weather, over all kinds of terrain.

The application of power and traction, through a vehicle's front wheels, as well as its rear wheels, gets results that are unattainable in any other manner.

Marmon-Herrington developed the Heavy Duty *All-Wheel-Drive* truck to new heights of performance, and introduced the conversion of standard trucks to *All-Wheel-Drive,* long before the war began. Still greater automotive triumphs are promised for the period of reconstruction that is to follow.

Remember Marmon-Herrington when peace comes, and trucks again become available to all who need them. We hope that time is not far away.

BACK THE ATTACK! BUY AN EXTRA WAR BOND

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All-Wheel-Drive **TRUCKS**

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. . . It FILLS all sap pores of lumber with waterproof, resinous matter.

. . . It HARDENS the lumber, preventing deterioration.

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Lumber properly treated with *PINOLA* is the equivalent of Original Heart Piné. Twenty-six years of test prove it best. Every user of *PINOLA* is a booster. If your dealer cannot supply you write to us.

THE *PINOLA* COMPANY
Savannah, Georgia

A sketch by Hunter Wood of the U. S. Coast Guard of an American tractor-bulldozer unit in action against the Japs.

American Bulldozer Doubles as a Tank

Bulldozers are normally used to push around earth, stones, trees, and stumps, but when Yankee and New Zealand troops were landing under heavy fire on Treasury Island in the Solomons last October 30, Aurelio Tassone of Milford, Mass., drove his big Baker-Allis-Chalmers bulldozer outfit off the landing craft on to the beach and kept right on going until he had pushed the enemy around. He didn't have a tank, but he had the courage which has made the American Tank Corps famous, and he did, also, have a crawler tractor with a broad metal bulldozer.

A New Zealand officer describes the action, which has been sketched by artist Hunter Wood of the U. S. Coast Guard who was also an eyewitness. "The American, with bulldozer blade uplifted like a shield, charged through the undergrowth until he reached the enemy machine-gun nest. Whereupon he dropped the blade, scooped earth over the Japs and buried them beneath a young avalanche. Half way over the hole, he swerved his improvised tank around, and then pulled away, leaving a flat smooth area with no trace of the Japs."

New General-Purpose Electrode Announced

A new general-purpose arc welding electrode for use with either alternating or direct current in the welding of mild steel in all positions has been announced by the Lincoln Electric Co., Cleveland, Ohio. The new electrode, named Fleetweld 37, was originally designed as an easy-striking smooth-operating electrode for light-gage material. Extensive use in production has also shown it to be a fast-operating electrode under all conditions.

A feature of the new electrode is that there is no slag interference when welding vertical down, giving excellent results in a position in which the greatest welding speeds on 8 to 16-gage steel are obtained. Further, the ability of Fleetweld 37 to withstand higher currents, both alternating and direct, makes possible higher welding speeds than normal. With proper currents it does not stick to the work nor burn through, making it especially desirable for light-gage welding.

This new electrode conforms to American Welding Society classifications for arc welding electrodes E-6012, E-6013, E-7011 and E-7012. The new electrode is available in 1/8, 5/32 and 3/16-inch sizes in 14-inch lengths and is packed in standard 50-pound containers.

Complete information on this new electrode may be secured direct from the manufacturer by mentioning this text.

Industrial Clothing Added To Goodrich Rubber Goods

Industrial clothing coated with rubber, synthetic rubber, or other synthetic materials has been added to the line of industrial rubber products made by the B. F. Goodrich Co., Akron, Ohio. These protective garments will be manufactured under limitations imposed by the War Production Board, governing the amounts of natural crude rubber, reclaim or synthetic rubber which can be utilized.

Indiana Uses Women On Erosion Control

(*Photos on page 4*)

To help solve the man-power shortage in Indiana, crews of women workers have been employed on some of the State Highway Commission's erosion-control projects. On one job on Route 75 near Cutler, in Carroll County, for which N. E. Daugherty was the contractor and E. E. Schnitzius, landscape subcontractor, a crew of five women was employed.

The ground was plowed and disked before the all-woman crew took over, and they carried on from there, handling the raking, sowing, and mulching of the freshly planted shoulders and backslopes. One of the crew drove a truck from which several hundred tons of hay was pitched by the others.

This crew spent about two months on the job, planted several miles of roadside, and was described by highway officials as very satisfactory workers.

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AND GRINDERS

Write for Circular on types, sizes and prices

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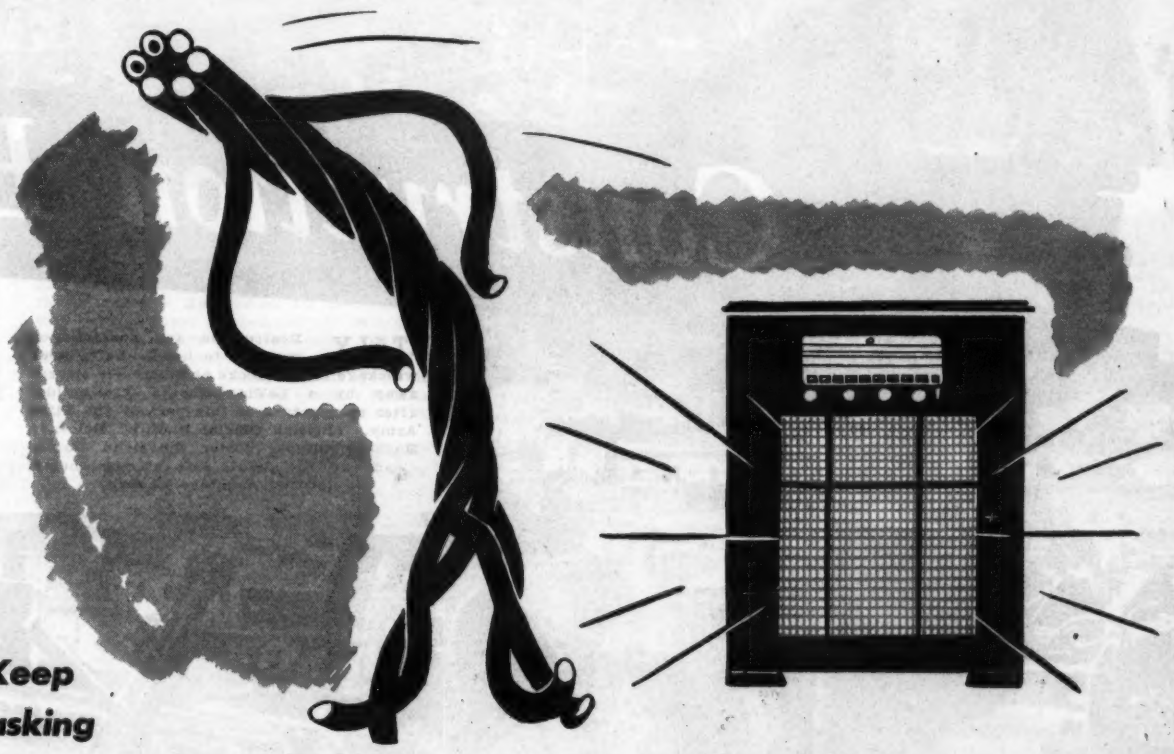
ELKHART INDIANA



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AMERICAN CABLE TRU·LAY PREFORMED WIRE ROPE

● When a wire rope runs around a drum or sheave its wires flex and bend. This is grueling work for a non-preformed rope because of the internal stresses forcible twisting sets up in the wires. But the preforming process relieves TRU-LAY of such stresses and endows it with truly remarkable resistance to bending fatigue.

Because . . . it resists bending fatigue!

This is just *one* of the advantages built into American Cable TRU-LAY Preformed —at the mill. Just *one* of the reasons why TRU-LAY Preformed wire rope is preferred by so many operators. Specify it for your next line. It will steady your machine production; save you time and prevent accidents.

No wonder the Armed Forces take so much of our production!

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ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

SOUTH PACIFIC. Material handling is as important on the fighting fronts as on the home front and the same type of equipment is doing the job. Left, a Lorain crane swings a load of munitions from shipboard to an Army amphibian truck. Below, a Jaeger Speedline mixer being used by helmeted Seabees to pour a foundation on a South Pacific island.

SICILY. Filling in bo[illegible]s and t[illegible] many dirt-m[illegible]nits busy. Tourneau bulldozer fills in [illegible] trap dug on the road to Agrigento [illegible]y. (Pho[illegible] Corte, Acme War [illegible]hotograp[illegible]

Construction Equipmen[illegible]

Machines Familia[illegible] Jo[illegible] Turn Up "at the Fr[illegible] Al[illegible] To Build Airfield[illegible] Sup[illegible] Perform Other Vi[illegible] Serv[illegible]

ITALY. Destruction and construction go hand in hand. Left, bomb wreckage on the docks at Salerno is cleared away by a LaPlant-Choate Trailbuilder after the capture of this port by the Fifth Army. (British Official Photo). Below, a Buckeye Clipper power shovel in Naples cleans up the debris left by the enemy. (British Combine Photo)

NEW GEORGIA. An [illegible]almers[illegible] bu[illegible] goes to [illegible] a road so that a Navy LST be[illegible]arby co[illegible] its cargo of tanks and truck[illegible] vehicles along this road aided in th[illegible]e of M[illegible] (Official U. S. [illegible]hoto)

RENDOVA. Tractors, similar to those used in construction, move heavy military equipment on far-flung fronts. This Marine Corps "Long Tom" is being moved by an International TracTracTor through jungle to a new position on Rendova Island. (Official U. S. Marine Corps Photo)

ALASKA. Transportation and construction are essential in carrying the war to the enemy. K rations for the fighting forces are hauled to their destination in an Athey trailer, more frequently seen, at home, equipped with a steel dump body for earth or rock hauling. (U. S. Army Signal Corps Photo)

…ding in bomb craters and tank traps keep many dirt-moving units busy. Here a Le-Tourneau scraper fills in a tank trap dug by the enemy at Agrigento, Italy. (Photo by Charles Gerretty, Acme War Photographer)

GUADALCANAL. In the heroic action on this previously little known island, construction equipment was in there fighting too. Below, one of the Link-Belt Speeder cranes used by the Seabees in their construction operations at Guadalcanal. Right, an Adams motor grader reconditioning and enlarging Henderson Field. (Official U. S. Marine Corps Photo)

…en at the Fighting Fronts

…nilian Jobs "Back Home"
…e Fr… All Over the World
…rfield… Supply Routes and
…r Vi… Services for Victory

NEW GUINEA. Construction played an important role in Army operations in New Guinea. Right, a Marion dragline doing its share in this war of movement. Lower right, a Caterpillar D2 tractor and rotary scraper cross a wood culvert on a new all-weather road built by the Army. (U. S. Army Signal Corps Photo). Below, half of a Cedarapids standardized Army mobile plant Model No. 2 set up on a hillside to produce road-building materials. (U. S. Army Signal Corps Photo)

…IA. …Chalmers tractor with …goes to work building …arby could discharge …vehicles which rolled …of Munda airfield. …Photo)

ALEUTIANS. The motor grader, familiar road construction and maintenance machine along the highways at home, is now operating on all of the global fronts. Below, an Austin-Western 99M power grader keeps an airfield in the Aleutians in condition.

BOUGAINVILLE. Cutting a path through the jungle is easier with a bulldozer than hacking your way through with machetes. Right, a Baker unit does some heavy clearing on a trail on Bougainville Island. (Press Association Photo)

Prevention of Drifts On Minnesota Roads

(*Continued from page* 15)

In addition to these general instructions, specific methods of operations are pre-established for each section, and printed instructions, covering the normal operation of the lighter equipment and additional directions in the utilization of the heavy equipment, which is stored in seven of the twenty-four section garages, are issued to the operators.

An example of the instructions on the use of light equipment follows:

SECTION 18
LOCATION: T.H. 100 West Limits So. St. Paul to Fort Snelling ..... 6.1 MI.
T.H. 13 Jct. T.H. 88 to Jct. T.H. 65 ..... 14.9 MI.
21.0 MI.
HEADQUARTERS: So. St. Paul—Leased Storage—Marie Avenue Garage
REGULAR EMPLOYEES: Richard Thibault, Highway Section Man; Otto Glowwe, Highway Section Helper.
EQUIPMENT: Unit 5760—1½-ton Marmon-Herrington-drive Ford truck (V8 1937 Model) with
Unit 5798—Bros V-plow or
Unit 4843—one-way interchangeable plow
Unit 8209—Highway sander
SEQUENCE OF OPERATIONS: This crew and equipment will first plow over 100 from So. St. Paul to Fort Snelling and return, using the one-way plow during light snowfall and the V-plow for heavy snowfall. After 100 is plowed out, the V or one-way, whichever is best suited for the road conditions, will then plow T. H. 13 from 88 to T. H. 65 and back, then over 100 to So. St. Paul. T. H. 100 is the most important and this crew should concentrate most of their effort on this highway.

Typical of the sequence of operations for heavy snow-plowing equipment is:

HEADQUARTERS: North Branch—State-Owned Garage.
EQUIPMENT: Unit 8403—4-ton Walters truck with
Unit 7626—American V-plow and
Unit 8361—8-foot Burch wing
Unit 7472—Gallon motor grader with
Unit 7642—Ross V-plow and
Unit 7643—Ross 12-foot wing
SEQUENCE OF OPERATIONS: Unit 8403 will do plowing and winging from North Branch over T. H. 61 to north line of Chisago County, then over T. H. 61 to Wyoming and east on T. H. 8 to Taylors Falls.
Unit 7472, the Gallon motor grader, will plow and wing from North Branch over T. H. 95 to the west line of Chicago County, then back over T. H. 95 to Taylors Falls and south on T. H. 95 to Copas.

The heavy equipment is more widely distributed and covers larger territories than the lighter but it is not in use as constantly and is generally controlled by direct orders from the District Maintenance Engineer rather than by printed instructions. In some storms the heavier equipment is not required at all and in other instances it goes into service and operates constantly until the emergency has passed, being shifted from one critical point to another at the direction of headquarters.

Snow Fences and Snow Storage

Snow fences are an essential part of the battle to keep the roads open, and their proper location and construction has been influenced by years of observation and study. With prevailing winds from the northwest during the snow season, the fences are set on the north and west sides of the roads, not parallel to the center lines but at an angle. The majority are of the vertical-lath type supported at intervals by posts driven into the ground. Other types have been successfully used but, due to its ease of movement and light weight, with its efficiency comparing favorably with heavier and more substantial fences, this type of fence finds general favor and is most extensively used. Fences are set a minimum of 100 feet from the top of the cut slopes, with even greater distance preferred, especially on the shallower cuts of 1 to 2 feet which, because of the limited snow-storage space they afford, are likely to cause the most trouble.

The fences are taken down each spring to prevent interference with farming operations, as well as to undergo repair and replacement, and are set back in the autumn in close cooperation with the land owners' activities. In pastures and open spots they are set out early but where fall plowing is to be done they cannot be placed until that is completed. The snow fences are set from 6 to 8 inches above the ground so that the wind sweeping under them has a tendency to build up the drift on the lee side. This action usually forms drifts considerably higher than the fence, which adds to their protective value and the snow storage afforded.

Snow storage outside the traveled way is the important consideration. Streamlined sections help considerably, permitting the removal of guard rails which not only cause drifting but interfere with removal of the resulting drift, as well as eliminating much of the drifting caused by nearly vertical banks in the old-style highway sections. However, streamlined cross section is not advantageous unless it also provides sufficient storage space. For that reason a rather high grade line, preferably streamlined but necessarily high enough to provide ample snow storage below road grade, is the answer to the prayers of the men responsible for keeping traffic on the move. On divided highways in snow country, the use of a wide, streamlined, deeply depressed section between the lanes helps immeasurably in providing convenient snow storage and for that reason is to be preferred to the usual level or even elevated division areas.

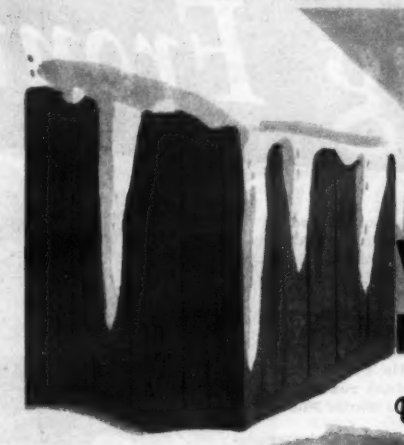
Another item bearing on snow storage is the placing of mail boxes along a highway. While it is usually outside the province of the Department to enforce the regulation, an educational program often works wonders. In Minnesota many mail boxes are set on iron-pipe standards simply constructed but offering clear roadway for the snow plows and resulting in convenience for the box owner. A piece of 1½-inch pipe is set vertically in the ground 5 feet from the outside edge of the shoulder. At a point slightly above the ground, it is usually bushed down to ¾-inch pipe which is bent through an angle of 90 degrees from the vertical and supports the mail box 4 feet above the shoulder with its roadside end directly above the junction of crown and slope. Boxes so placed offer no interference to the passage of the snow plow, thus enabling the operator to clear the road all the way to its edge so that the mailman can drive alongside and place mail in the undisturbed box after the snow plow has *not* knocked it down.

Motl Motors Through Storms

Ordinarily the Department has several hours' notice before a serious snowfall but regardless of the shortness of the warning they are ready. Equipment is serviced and fueled at all times and day or night the fleet goes into action when the snow starts.

When a severe or unusual storm is approaching, Mr. Motl, the State Main-

(*Continued on next page*)



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IF the compressor is a Gardner-Denver Water-Cooled Diesel Portable, here's what happens:

- The coolant of the starting engine circulates through the "Caterpillar Diesel" engine jackets and takes off the arctic chill.
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- While the "Diesel" is slowly warmed up, with clutch disengaged, the pump circulates the rapidly warming coolant in the engine-compressor cooling circuit and warms the cylinder walls of the still idle compressor, for immediate lubrication when the clutch is engaged.

And that's why you'll find Gardner-Denver Portable Compressors preferred for winter jobs—and why the Gardner-Denver Portable delivers maximum air output. Burned-out bearings or scored cylinder walls and pistons due to cold weather starts are unknown to Gardner-Denver users.

You'll find that the Gardner-Denver Portable is equally efficient in tropical heat, too. For the same water-cooled construction assures a cooler running compressor, no matter what the heat.

For complete information on these "all-weather" portables, write Gardner-Denver Co., Quincy, Ill.

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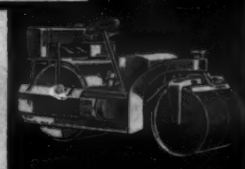

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Minnesota Department of Highways Photo

This Minnesota car owner wishes he had stayed at home.

Maintenance Engineer On Inspection Trips

(*Continued from preceding page*)

tenance Engineer, is immediately notified by the information man in the Maintenance Division and, from his office, he personally contacts all District Maintenance Engineers to check their preparations and advise them of probable developments. In this organization, with authority and responsibility properly decentralized, and the District Maintenance Engineers in touch with, and command of, the situation, Mr. Motl feels that his presence at the central office is not always necessary. He leaves his principal assistants in charge, one of whom is on duty constantly until the emergency ends, so that he can authorize major shifts of equipment and personnel from distant parts of the state if necessary, while Mr. Motl, like many another good general, goes to the front.

He climbs into his rugged and dependable 1937 Buick (probably the oldest car in use by the Maintenance Department) which is equipped with standard tires and chains on the rear wheels only, and heads out into the storm to make first-hand observations. Around his rear bumper is wrapped a heavy tow chain 20 feet long, his car is ballasted with 200 or 300 pounds of sacked sand which may prove very helpful in providing additional traction as well as ballast, and he carries a long-handled shovel. Windshield and all windows are covered with frost shields.

According to Mr. Motl, it isn't snow which usually blocks highways, it is traffic. One car with slick tires and no chains slips into a ditch with one end out in the road or two cars collide in the blinding storm. Other drivers, in a frenzy to get by, start around the obstructions, stall and form more obstructions, more cars from both directions crowd in to the last available inch, and the road is blocked. Snow plows can't get through, the falling snow drifts deeper and deeper, and the road is out of service for many hours.

Although, in his years of service, Mr. Motl has pulled out hundreds of stalled cars, many of which needed only the slightest help, he says he has never yet had to pull out an experienced driver whose car was properly equipped with good tires and chains, unless mechanical difficulty was to blame.

His first advice to the motoring public is to stay at home during bad storms. Unless you have to be out, stop at the first convenient place and wait till the snow plows have had an opportunity to function. If you must travel, and he means *must*, not *want to*, then see that your car is equipped with good tires and chains, the power plant in good condition, and the gas tank full. Carry plenty of extra blankets and some emergency food supplies because roads blocked by conditions such as those described above are not cleared in a matter of minutes.

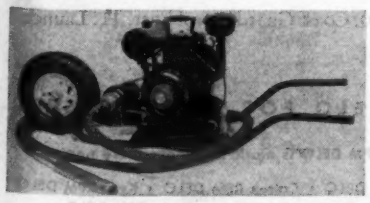
On his trips, the Maintenance Engineer goes where the going is toughest, his route uncertain and the duration of his trip equally so, over roads which are only partly cleared of snow and sometimes around traffic jams by driving across the streamlined ditch section with which many miles of Minnesota highways are blessed. Many a weary plow operator, nearing exhaustion after many hours of cold and tiresome labors, has received a lift from seeing the "Boss" and the thought that "if he can take it so can I". Mr. Motl is not an armchair executive and the spirit and efficiency of his snow-removal organization reflects that fact.

Operations During and After Storm

Operations are dependent on the location and severity of the storm. Winter snows, although dry and comparatively easy to handle, are usually accompanied by high winds and low temperatures, while the November and April snows are apt to be damp and heavy. Early autumn snows also come before the shoulders are completely frozen and introduce hazards to heavy equipment operating at the road edges.

The wet heavy snow, if it can be handled early, is most easily pushed from road center to edges by a motor grader but if this type of snow remains long in place it may offer extreme problems. Full of moisture, this snow freezes readily and can be moved only with extreme difficulty and heavy equipment. Even this heavy equipment has to run in tandem at times, or single units back off and run at the drift with smashing tactics which sometimes break through. In extreme cases large crews of laborers have to be employed to break the crust

(*Continued on page* 58)



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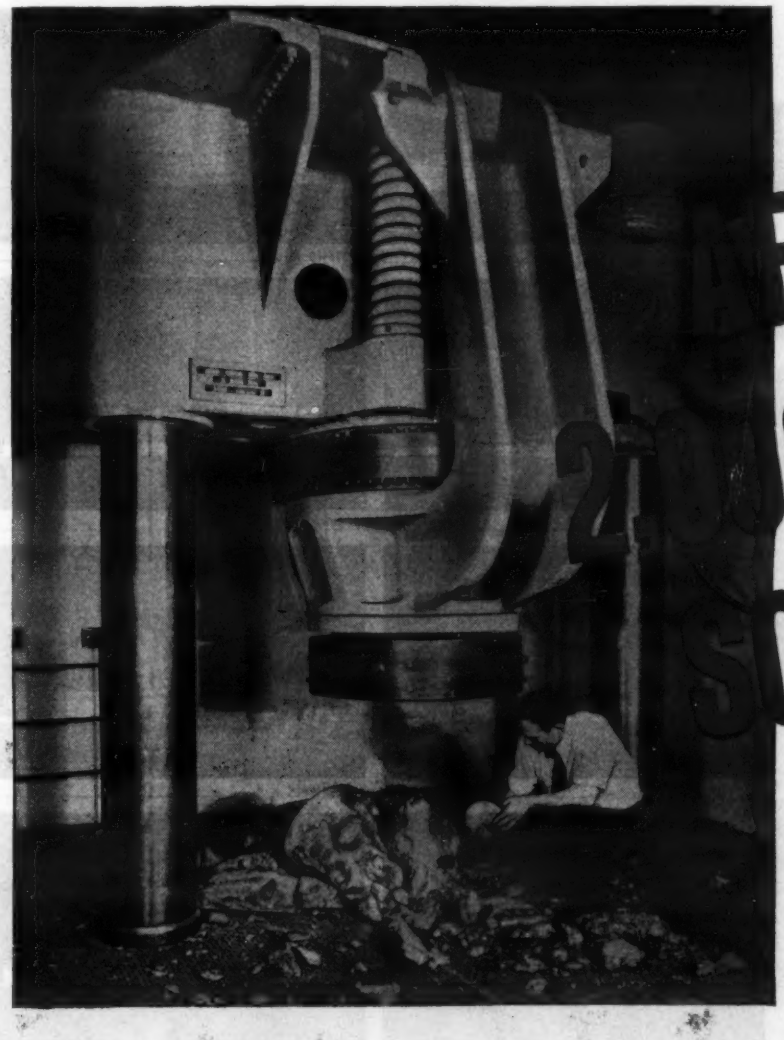

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TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

An Indiana Highway Widened in Wartime

Brooks Construction Co. Adds 4 Feet to Width of Roadway for 19.64 Miles; Hot-Mix Used for Base

(*Photos on page 72*)

✦ SALVAGE is the keynote of the wartime highway program in Indiana. Narrow highways carrying heavy war-production traffic are being widened 4 feet, and nearly 200 miles of old surfaces not broken beyond usefulness as a base have been salvaged by resurfacing with hot or cold-mix asphalt binder and rock-asphalt wearing courses. The Brooks Construction Co. of Fort Wayne, Ind., had the contracts for 19.64 miles of widening in Starke and La Porte Counties, Indiana, during the summer of 1943. Later, 5.45 miles of this route was resurfaced under another contract.

The widening contracts were let August 25, 1942, to the Brooks Construction Co. and were completed in 1943. All of the Brooks work was done under two-way traffic with proper barricades to protect motor traffic from the hazards of the long open trench and the new base in the widened sections. The barricades used were mostly old oil drums set along the edge and illuminated with bomb torches at night.

The Widening Trench

The widening trench on this job was cut 36 to 40 inches wide by a Buckeye trencher mounted on a flat-bed truck. A plow at the outer edge of the trench and ripper teeth on the bucket wheel made possible cutting the trench that width with a 33-inch bucket. Care was taken to cut the trench slightly into the edge of the pavement to be certain that the widening strip of bituminous concrete would be firm against the base material of the original road. In some places, where the shoulder was hard, it was necessary to use a ripper ahead of the trencher.

Immediately behind the trencher one man swept the pavement clean and another removed any material that fell into the 8-inch trench. In places where the subgrade was unsatisfactory as to strength, the contractor was required to spread a 1½-inch insulation course of minus ½-inch limestone screenings, specified as subgrade fine aggregate, rolled to compaction by a trench roller. The contractor used a Galion trench roller giving compaction equivalent to a 10-ton roller on the trench and another on the insulation course.

A line of Blaw-Knox steel road forms 9 inches high and with an 8-inch base was set to line and grade in the widening trench for a 2-foot 3-inch widening strip, to support the bituminous material during rolling and until set. The form hauling crew started work each day one hour ahead of the form setters, having pulled the stakes the night before. The form setters worked 8 hours a day while the hot-mix spreader box ran 12 hours. The forms were set so as to lean toward the inside of the trench a little to take up the pressure of the roller against them. This made it unnecessary to use 2 x 2 braces as in most jobs of this type. The contractor did use extra pins in all places where the subgrade was sufficiently weak to require the insulation layer on the bottom of the trench. Before the placing of the base material in the trench, the forms were oiled by hand brushing.

Bituminous Widening

The bituminous widening consists of a base course of two 3-inch layers of hot-mix asphaltic concrete, a 2-inch hot-mix asphaltic-concrete binder applied to the completed base course, and a ¾-inch wearing surface of rock asphalt. Wherever necessary, the rock-asphalt widening was extended onto the existing pavement to eliminate depressions at the edge of the pavement.

Before any bituminous material was placed in the trench, the inner side against the old base was primed with an asphalt emulsion by spraying with a hand hose from a distributor. The hot-mix asphaltic concrete was then placed in the trench in two 3-inch layers, each rolled to compaction by one of the trench rollers. If any edge failures occurred prior to, or during, the placing of the layers of base, the contractor repaired them with the same bituminous concrete used for the base. Low spots and breaks were hand or pneumatic-tamped to as thorough compaction as the trench material itself.

A Jaeger widening spreader box was used for placing the bituminous mix in the trench. It was pulled ahead by the hauling trucks by means of a long chain that hooked on the front bumper, a safety method that is worth noting. The chain divided into two at a point beneath the center of the truck so that the two parts of the chain passed between the

(*Continued on page 60*)

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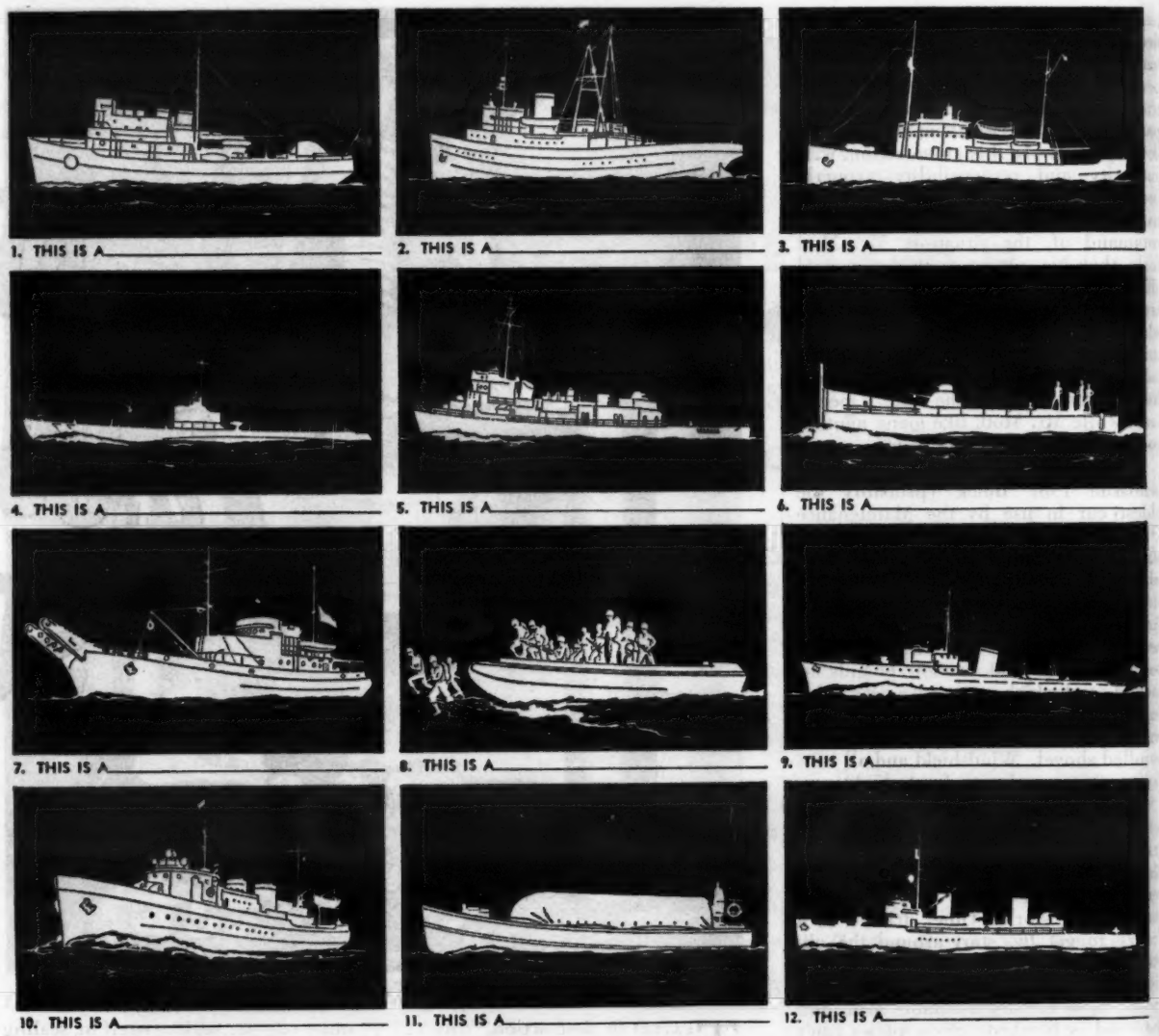

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These boats do the "leg work" for our fleet. Their jobs are not always spectacular—but each has a critical assignment in the blueprint for victory, none must fail at a moment of decision. That's why the Diesel engines in so many of them are lubricated with Standard of California's RPM DELO.

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Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity

STANDARD OF CALIFORNIA

New Asphalt Surface For Old Brick Road

(*Continued from page 22*)

course, commonly referred to as a "scratch coat", throughout the length of the job over the entire center section to within 3 feet of each edge of the brick. This varied from a minimum of zero to 2½ inches in thickness. The scratch coat was necessary because of the extra depth required to true up depressions in the old surface. As the scratch coat was spread, a very thin layer was left on the higher sections of the old brick surface. This served the purpose of the usual tack coat by leaving an open surface texture of asphalt and fines which permitted the interlocking of aggregates when the leveling course was placed.

The scratch coat was followed by the leveling course of 1-inch minimum thickness and the top or surface course of 1-inch thickness, laid alternately three days at a time, thus completing a section across the entire width every three days. Prior to placing the leveling course, a strip 2 feet wide on each outer edge of the brick was painted with asphalt. The leveling course overlapped this painted strip for 6 inches and was feathered from a point about 2½ feet back down to ½ inch.

When the top course was placed, it extended out over the remaining 18 inches of the painted strip to the edge of the concrete gutter and was feathered to a minimum of ½ inch from a point 2½ feet back. The inside edges of the outside passes of the top course were laid to a chalk line. Top joints overlapped the leveling-course joints 6 inches. The leveling course was laid in three 11-foot strips and the top was laid in one 10-foot strip and two 13-foot strips. The 13-foot strip was obtained by an extension strike-off on the mechanical spreader, devised by the contractor.

In the section completed in 1943, there were over 100 manhole tops to be raised. Extra pains were taken to avoid a bump by carefully setting these to grade in portland-cement concrete after the scratch and leveling courses had been placed.

A 500-foot section at the east edge of Painesville presented a challenge to the skill of the contractor but was laid very successfully by the spreading and finishing machine. At this point the highway parallels the New York Central railway and rises with a steep grade to pass under the railway from the south side with a very short curve on a 90-degree turn and then reverses with a somewhat easier curve on the north side. On the south side of the underpass the highway intersects with a north and south road. A traffic island, which extends around the curve on the south side and which was built to help relieve the extreme hazard of the sharp curve combined with the underpass and the intersecting traffic of the other road, divides the highway into two approximately 13-foot lanes through the underpass. Working out the different elevations and super-elevations of the two lanes, together with the cross-overs for the other road and the warped intersection for the road to the south, represented a neat piece of work with the spreading and finishing machine.

Specifications

The T-35 asphaltic-concrete surface course laid was of Type B, which has a finer grading than Type A which was used for the leveling courses. A typical Type B analysis follows:

Passing	Retained on	Per Cent
¾-inch	½-inch	...
½-inch	⅜-inch	2.6
⅜-inch	No. 4	37.7
No. 4	No. 6	7.4
No. 6	No. 8	3.4
No. 8	No. 16	10.0
No. 16	No. 50	28.0
No. 50	No. 100	2.4
No. 100	No. 200	0.6
No. 200		0.6
Total on No. 6		47.7
Bitumen		7.3

Texaco asphalt of 85 to 100 penetration was used. The aggregate was crushed slag combined with a local silica sand.

Looking south through the underpass on the Cuyahoga Asphalt & Paving Co.'s resurfacing contract on U. S. 20 in Ohio.

Personnel

Ben Shelley was Superintendent for the Cuyahoga Asphalt & Paving Co., Cleveland, Ohio, contractor, under the supervision of Carl Photo, Project Engineer for the State, J. H. Mainey, Acting Resident Engineer for Lake and Geauga Counties, and H. T. French, Assistant Division Engineer in charge of construction, Division 12, Ohio Department of Highways, of which H. G. Sours is Director.

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WHEN TRACKS MUST TRAVEL ON A SLOPE AND YOU WANT TO ESTABLISH A LEVEL CUT: Tilt in with the advance corner low, which starts a leveling cut and throws the material out along the angled blade, overcasting the excavated material. As tracks move onto the section you have notched into the bank and filled on the slope, continue with the tilted blade only long enough to get tracks on the desired grade level. Then adjust back to a level blade but continue to lead with the inside corner in order to plow the material out to fill on the side slope. 1

WHEN TRACKS MUST TRAVEL ON THE LEVEL AND YOU WANT TO ESTABLISH A SLOPING CUT: With front corner tilted down, take a cut along the centerline of your ditch until you have a track length. Then level the blade and, working your tractor on the slanted bank, continue to angle your material up the slope and into your spoil pile. If you are opening a V-ditch, repeat on the opposite side at proper slope to make the desired cut. 2

PEELING (OR SLOPING DOWN) VERTICAL OR STEEP BANK: Tilting the forward corner of the blade up and raising it high, use the end to "peel" or shave off the material. Continue the operation until you bring the bank to the desired slope, or until you have a slope on which the tractor can operate. 3

Find out about the complete line of Bucyrus-Erie Tractor equipment from your nearest International TracTracTor distributor. There are blades, scrapers, rippers, rollers, and grubbers that will give you speed and economy.

In all blade work, reduce backing up moves whenever you can. Plan all possible work to dig both ways not only to apply more of your time to moving dirt, but also because excessive back-up makes for excessive tractor maintenance.

N58

BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

Universal Atlas Engineer Retires from Active Service

Paul C. Van Zandt, Consulting Engineer and former Vice President in charge of Engineering and Operation, has retired from service with the Universal Atlas Cement Co., U. S. Steel Corp. subsidiary. Mr. Van Zandt, who had served with Universal Atlas since 1930, has spent more than forty years in the design and installation of cement plant machinery in the United States, Canada, Mexico, Cuba, and China.

Mr. Van Zandt was a former Chairman of the Technical Coordinating Committee of the Portland Cement Association, is the author of a number of technical papers on the cement industry in the Orient, and is a member of the American Society of Mechanical Engineers.

Navy Needs More Officers

The Director of Naval Officer Procurement has requested our cooperation in informing mechanical engineers that commissions and warrants are still open for qualified engineers who are American citizens and not over 50 years of age. These engineers must be sound physically but special consideration will be given to men with minor physical defects, other than those which are organic.

Preliminary questionnaire forms may be secured from the nearest office of Naval Officer Procurement. Those in the New York area may apply at 33 Pine Street, New York 5, N. Y., or telephone WHitehall 3-4060, Extension 59, Commander J. C. Latham, USN (Ret.), for appointments.

New Link-Belt Officers

Announcement has just been made of the election by the Board of Directors of the Link-Belt Co., Chicago, Ill., of E. L. Berry and Richard F. Bergmann as Vice Presidents of the company. Mr. Berry, Vice President and General Manager of Link-Belt Ordnance Co., now becomes Vice President of the parent organization, with headquarters at the company's general office in Chicago. Mr. Bergmann, who came to Link-Belt in 1924 through the purchase of Howe Chain Co., will also be located in Chicago.

John E. Martin, since Pearl Harbor assistant to Brigadier General G. M. Wells, War Department, Washington, D. C., has been appointed Manager of Link-Belt Ordnance Co., with headquarters at the plant.

YOU can't build "too good" for war! But there have been manufacturers who have thought there was a limit to quality requirements for peacetime service. That hasn't been the slant that Iowa Engineers have taken on the development of Cedarapids equipment, and, if it was not for the terrible phases of the picture, we would welcome the opportunity the war presents to test and learn about Iowa performance under wartime's terrific stress for the improvement of peacetime equipment.

Cedarapids equipment has met and is satisfying the problems of war. A plant a day rolls out of the great Iowa assembly bay to some battlefront. The enormous wartime effort, *unequalled in this specific field of production by any other manufacturer of similar equipment,* will give Iowa an *experience* that will mean aggregate producing equipment that will be ever *more profitable* for the American contractor.

Talk to contractors that are using Iowa aggregate and asphalt plants. Check the records that Iowa plants are establishing for production. Find out about Iowa's low operating and maintenance costs.

Whether it is crushers, screens, bins, asphalt plants, driers or washing plants, Iowa is Headquarters for aggregate reduction and handling equipment. Can we help you with your plans?

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ROCK AND GRAVEL CRUSHERS
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WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS

IOWA MANUFACTURING CO., Cedar Rapids, Iowa

Post-War Planning Reality in Arizona

Using Available Engineers, Women Designers, Tracers, State Highway Dept. Has Contracts Ready to Let

✦ THE Arizona State Highway Department does not sit back and wish that its highway planning for the period following the war could be completed in detail. According to E. V. Miller, Engineer of Plans and Surveys, the Department, under the direction of Bernard Touhey, State Highway Engineer, is now busily engaged, despite wartime shortages of man-power and transportation, in making location surveys and detailed construction plans for many miles of post-war highway building.

Nor does Arizona stop there. Specifications, special provisions, and other contract documents are prepared at the same time and that item which too many states are leaving for the future, right-of-way acquisition, is also completed as soon as plans are approved. By so finishing all phases of the work preliminary to advertising for bids, the Arizona State Highway Department is in the enviable position of being able to insert requests for bids in the very papers which carry the details of the final surrender of our enemies.

At the time of Pearl Harbor, the Department patriotically felt that its engineering personnel should be made available to those directly engaged in the war effort, so 80 per cent of the drafting-room forces were released for war service. When the large planning program was authorized and put into operation in July of 1943, this loss of trained personnel was felt very keenly, but the return of some former employees from war jobs scattered from Alaska to the tropics and the acquisition of some new men has somewhat alleviated this paucity of personnel.

Field work is carried on by nine survey parties working under the direction of the central office. Each party consists of a chief, an instrument-man, a draftsman, and whatever number of men in the sub-professional grades the nature of the job may require.

The use of women in the drafting room is no experiment in Arizona. Shortages in trained personnel aggravated by the conditions of World War I started the employment of women as draftsmen and there have been some women in the drafting-room organization ever since. There are two women designers whose work is considered excellent, and a considerable number are employed as computers, tracers, and on similar work.

Arizona has no bonded highway debt so that the entire highway revenue derived from the gasoline tax is available for operations, construction and maintenance. The 5-cent tax is divided with the counties on a basis whereby the state receives 3½ cents and the counties 1½. This 70 per cent normally provides the Highway Department with $2,500,000 annually to be used for matching Federal-Aid funds or construction of non-participating roads as desired. The present planning program is being paid for from state and Federal funds with a division of 72 per cent Federal and 28 per cent state.

The work being planned is of all sorts. Little essentially new-route construction is contemplated although the improvement of the existing system to present-day standards does necessitate many miles of new location. Heavy grading, bridges, and surfacing with concrete and many types of asphaltic plant and road-mixes are all included in the program. Planning is being done and specifications written with the assumption that all pre-war construction materials will again be available, and the only substitutes contemplated are those which have proved to be satisfactory and more economical than the materials for which they have been substituted. Among the items in this classification, according to Mr. Miller, is the use of wooden expansion joints, either of redwood or Ponderosa pine. Although not yet incorporated in the Arizona standard specifications, the use of expansion joints of wood is authorized in the special provisions prepared on many of the contemplated jobs.

In arranging the planning program, a goal was set of plans for $1,200,000 of work by December 1, 1943, and this quota was reached. An additional $1,900,000 of work was completely planned by Christmas, Mr. Miller says, another $5,000,000 will be planned by March 1, 1944, and $4,000,000 additional by June 1, making available for letting a total of work amounting to $12,100,000 by midsummer of this year.

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TUTHILL convex design and spring-like, deflective action, assure maximum safety, exceptional visability, attractive appearance, economical installation and low-cost maintenance.

Be sure to include the TUTHILL Guard Rail in your Postwar Plans for Highway Safety.

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★ **Feed capacity over 8 feet, handles depths to over 25 feet.**

★ **Recoil device holds machine to its work, increases drilling speed 10-25%.**

★ **Forward leg point holds the drill and steel in line on all kinds of holes.**

★ **Centralizer keeps steel from "walking" when starting hole, prevents breakage of bit points.**

★ **Twin jack-screw mechanism permits easy moving of U-bar, shortens set-up time.**

★ **Main wheels swivel 90° for line drilling, and 180° to obtain narrower tread.**

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Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law.

Injury Through Delays Essential to Liability

A possible cue for contractors, in cases where damages for delayed performance are asserted against them, is furnished by the decision rendered by the New Jersey Court of Chancery in the case of Calabro Construction Co. v. Township of Hamilton, 25 Atl. 2d, 515, affirmed by the New Jersey Court of Errors and Appeals, Standard Accident Insurance Co. v. Township of Hamilton, 25 Atl. 2d, 526.

A sewer construction contract specified that the contractor should pay damages at the rate of $50 for each day that completion of the job should be delayed after a fixed date. The courts disallowed damages under this clause because it did not appear that the township for which the sewer was built sustained any loss or prejudice on account of delay, if there was any delay. It was decided that a contract clause of this kind will be enforced where it is difficult or impossible to compute actual damages, and where the amount specified is treated by the parties as being a fair and reasonable approximation of actual damages, and where there is loss or prejudice resulting from a delay in performance.

In this case, the courts thought that it was doubtful that there was any actual delay, but noted that there could be no loss to the township because there were other contracts that remained unperformed and that had to be performed before the particular sewer could be used.

Change in Nature of Work

A municipal sewer contract provided that the Town could increase or decrease unit quantities of work to be done, not adding to or taking away from the total work more than 20 per cent. This provision did not empower the Town authorities to shift the location of construction lines from dirt portions of streets to macadam portions, the New York Supreme Court for Monroe County decided in the case of Empire Foundation Corp. v. Town of Greece, 31 N. Y. Supp. 2d, 424.

The court said that, although it was difficult to define precisely the scope of power existing under the contract clause in question, it was clear that the clause could not so operate as to "give to the Town the power to make changes so radical and so pervasive as to be destructive of the identity and purpose of the contract."

It was further decided that the contractor, who did the changed work under protest, did not forfeit the right to damages and compensation for the extra work necessitated by the change, through failing to file a written claim therefor as required by the strict letter of the contract, the Town's consulting engineer having assured him that that requirement would be waived.

The court also ruled that the damages recoverable by the contractor should be measured by the difference between the reasonable value of the work done, as changed, and the reasonable cost of the work had it been done in the location contemplated by the original contract.

Engineers Possess Varying Authority

If we were to engrave a table of commandments for the contractor, one would read something like this: "Don't imagine that just because a supervising engineer is the owner's representative he has unlimited power to bind the owner by supplemental agreements concerning the job."

As a general rule, the engineer is hired to see that the contract is *performed as written*, and has no power to *change the terms of the contract*. When he commences to agree that the owner will do something that the contract does not call for, it is time for the contractor to find out whether or not the engineer has stepped outside the batter's box.

But, of course, an owner can select an agent with general powers to do whatever he could do himself, including the modification of contract clauses, etc.

Because the court found that a railroad company's chief engineer had been given general powers in the relocation of the company's railroad, the United States Circuit Court of Appeals, Sixth Circuit, decided that, if he promised the contractor that the company would pay damages resulting from the contractor's being delayed in the performance of his work, the promise was binding on the company.

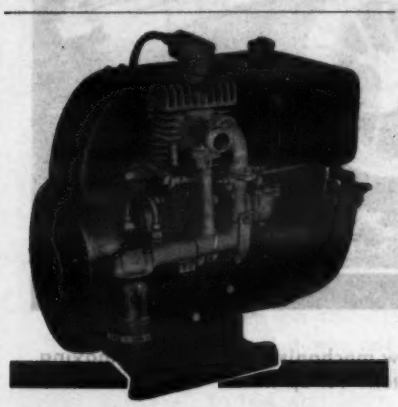
Incidentally, the court decided that where an agreement supplementing a construction contract is not of such nature as to require that it be reduced to writing and signed, an oral agreement is sufficient. That the original contract specifies it can be changed only by written agreement makes no difference. (Grand Trunk Western Railroad Co. v. H. W. Nelson Co., 116 Fed. 2d, 823.)

Bond Rights of Dealers

Socially, "blind man's buff" is a pastime that is on "the way out". In the business world a reluctance to acquire a degree of legal knowledge still makes it popular to "trust to luck" in attempting to collect a debt from a third party if a primary debtor fails in his obligations.

A decision of the Louisiana Supreme Court suggests that it may be as important to an equipment dealer's credit manager to know just who is legally *liable for the payment of an obligation* as it is to know whether an obligor is solvent. It was decided (Louisiana Highway Commission v. McCain, 1 So. 2d, 545) that a statutory bond given by a highway bridge contractor did not protect a company that rented equipment to the contractor for use in performing a contract. The equipment consisted of barges used to carry traffic while the bridge was being constructed, a dragline, a bulldozer, tractors and graders.

The court decided that a Louisiana statute was so worded as to make the contractor's bond operate for the security of third persons furnishing to him materials necessarily *incorporated into the job*, or *consumed* in the course of the work, but not so worded as to cover the payment of rentals due for the use of "instrumentalities forming a part of the contractor's plant or equipment used in doing the work which survive the performance and remain the property of their owner."



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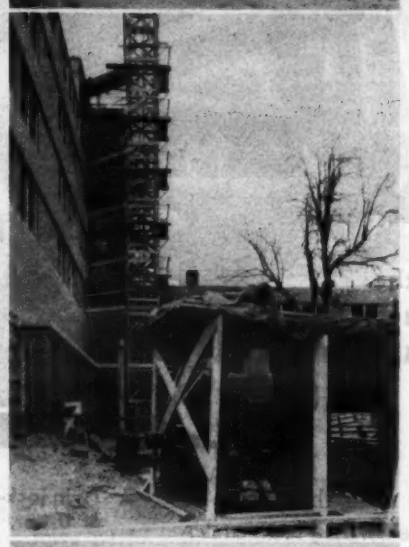

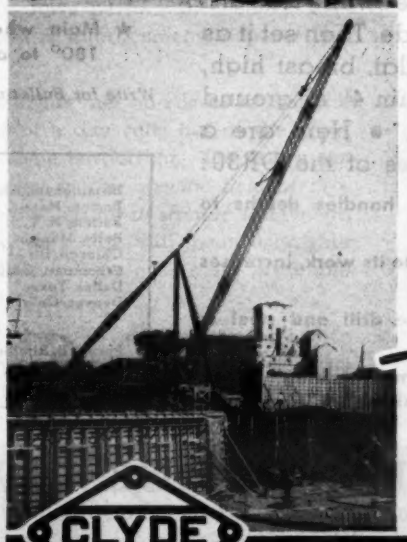

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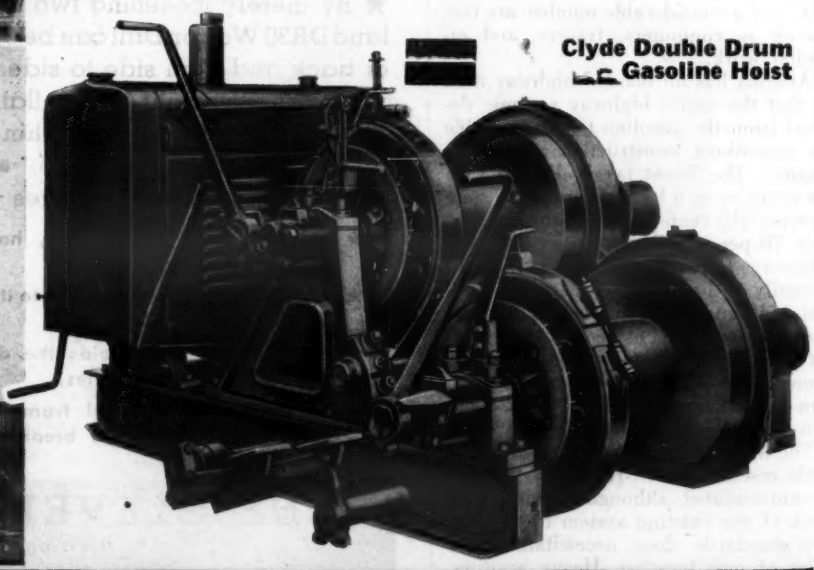
Clyde equipment is designed and manufactured to give more efficient and economical performance . . . every part is carefully engineered for its particular load and duty . . . every machine has precision workmanship throughout.

The common-sense advantages of Clyde Gasoline Hoists will help with your post war construction problems. . . . Write for Bulletin K-4 now.



Clyde Double Drum Gasoline Hoist

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CLYDE IRON WORKS, INC.
DULUTH, 1 MINNESOTA

Wire-Rope Buyers Guide

A new 170-page catalog and wire-rope buyers guide, containing the latest tables and information in accordance with the new simplified practice on wire rope, has recently been issued by the Macwhyte Co. Helpful information on the conservation and care of wire rope, with a general index and tabbed index indicating the contents of each section, features this new booklet which replaces all previous Macwhyte catalogs.

Copies of this catalog and guide, known as G-15, may be secured by interested contractors and engineers by writing on their company or department letterheads direct to Mr. J. S. Whyte, President, Macwhyte Co., Kenosha, Wis., and mentioning this magazine.

New Huber President

The Board of Directors of the Huber Mfg. Co., Marion, Ohio, at its annual meeting in December, elected D. A. Howard as President and General Manager to fill the vacancy left by the death of E. J. Schroeter some months ago.

Mr. Howard, who has been Vice President and General Manager since January, 1943, joined the Huber organization in 1924 as Treasurer and since then has served in various official capacities. He was appointed a Director of the company in 1929. As Vice President and General Manager, Mr. Howard has been influential in bringing about many reforms and advances in production procedure at the plant, and has taken an active interest in new policies and in the sales end of the business.

The Huber Mfg. Co. states that it is now getting its house in order so that new developments in road-building machinery will be ready for the post-war trade when its war orders have been completed.

New Gas Regulators

The Victor Gas-O-Dome regulators, made by the Victor Equipment Co., 844-54 Folsom St., San Francisco, Calif., for use in controlling delivery pressures of compressed oxygen and acetylene are described and illustrated in a new bulletin just issued by that company. Available in several models, these Gas-O-Dome regulators are sturdily constructed, easily operated, and provided with relief valves for safety.

Copies of this bulletin may be secured by those interested direct from the company. Just mention this item.

..That *War Birds* may fly sooner

"SOMEWHERE in England"—there are lights shining through the night! There is the rumble of drum gears mixed with the clatter of concrete as it pitches from the drum buckets, a discharge bucket rolls out on the boom and another yard of concrete slithers in a ribbon across the subgrade of a new runway—

Sometimes the alert comes and the lights are doused as the Hun wings overhead.

All over the world MultiFoote Pavers are rolling out wide ribbons of concrete. The dependability of their hour after hour operation and their tremendous output is amazing, even to those who have had experience with MultiFoote pavers before.

Wartime operation has lessons that will influence peacetime profits. MultiFoote postwar owners will secure the benefits of an advance experience, smoother operation, better design and greater output—an advantage that could only come with the study of a *great number of machines on "highball" work.*

Remember there are more MultiFoote pavers in service than any other make. If we can help you in your future plans, ask for details.

ARMY E NAVY

THE FOOTE CO., NUNDA, NEW YORK

For black top pavement ask about the Adnun Black Top Paver. It brings you advantages that no other black top paver can offer.

MULTIFOOTE
CONCRETE PAVERS

Wartime Maintenance Of Georgia Bridges

(*Continued from page 2*)

Bridge" and other caution signs.

Substitutes for Treated Timber

The use of substitutes for the standard pressure treatments of timber has been necessary because of the various restrictions. Not only has the use of first-grade timber been outlawed by priorities, but the creosote for preservative treatments has been required for war services. M. S. Steadman, former Maintenance Engineer, State Highway Board of Georgia, speaking at last year's conference of the Southeastern Association of State Highway Officials, stated:

"We have found it necessary to use a considerable quantity of the lower grades of untreated pine on secondary routes, and on more important routes we have used a considerable quantity of this lower grade treated in our vats with pine oil by immersion methods. We find that this pine-oil vat treatment adds materially to the life of this sap timber and is a fairly good substitute under present conditions. There are a number of pine-oil treatments on the market that can be used in the open-vat treatment of timber; however, we have used only two of these and both have proved fairly satisfactory. We found that this material used in sign posts and bridge flooring, placed in service alongside untreated timber of equal grade, showed a very marked superiority. At the end of a 3-year test on sign posts and flooring, we found that pine-oil-treated timbers were in good condition, while untreated sap timber of equal grade was badly decayed. There are other vat treating materials, such as salts and creosote oils, that no doubt have good preservative qualities and would make good substitutes for pressure-treated creosoted material.

"The use of substitute materials for the emergency is not our only problem in timber bridges. It is necessary that we also substitute methods to bring these bridges, which in most cases are not capable of carrying the loads to which they are subjected, up to the required loading capacity. We are doing this by driving extra piles where necessary and in some cases inserting posts on mud sills to strengthen the bent, and adding an intermediate framed bent on mud sills on long spans. Additional loading capacity to take care of unusually heavy loads can be secured by the addition of stringers through the central section for a width of approximately 5 feet each side of the center line and inaugurating one-way traffic for extra-heavy trucks. These extra stringers can be placed without removing flooring by the use of timbers of approximately 2 inches less vertical dimension than the original stringer on 2-inch blocks. The placing of a bituminous mat on timber bridges will increase the loading capacity by removing irregularities in the riding surface and thereby reducing the impact."

Care of Steel Bridges

A special crew has been organized for the maintenance of the steel bridges in the coastal part of Georgia. There were three of these crews before the war, but it has been possible to maintain but one since the demand for man-power has been so great in other activities. This crew has several trucks, each equipped for a specific service. One truck carries the sand-blasting outfit used for removing old paint where it is loose and for thoroughly cleaning the steel before repainting. A truck with an acetylene, as well as an electric, welding outfit is another unit with the bridge crew. If the sand-blasting shows weakened members, a splice is made by welding. The necessary material for these splice plates is salvaged from abandoned bridges. Some difficulty has been experienced in Georgia in holding the best of this salvaged material for the repair of bridges, as the WPB has repeatedly urged the Department to sell all the scrap to dealers for immediate conversion into war material. Here scrap is being put to a very important service for the war effort to keep the existing bridges in use for the hauling of materials and personnel to and from the various war plants.

Spot painting for the maintenance of the protective paint film on the steel is done by the patrolmen, but the major paint work is done by the special bridge crews with spray outfits. Red lead is used, followed by aluminum paint on members exposed to view and graphite paint on the underside of the structure. The state was fortunate in having a good supply of aluminum paint on hand prior to Pearl Harbor, but this supply is about exhausted. The best substitutes available will be used in the future.

Financing Bridge Maintenance

The bridge maintenance fund has never been sufficiently large in Georgia to maintain all the bridges adequately. The state has an unusually large number of bridges, so that what might have seemed an over-balanced budget figure would have been required for proper maintenance. This led to the maintenance of only those bridges in the worst condition, with patching taking the place of the required rebuilding over a period of years.

There were 489 timber bridges on the program for repair in the fiscal year which ended June 30, 1943. A special fund of $500,000 was set up for this work over and above the regular budget. Not all of this was used because of the lack of men and materials so the balance was returned to the general fund at the close of the fiscal year.

The regular budget at the same time allowed about $125,000 per month for the maintenance of the highways or about $10 per mile for both road repair and bridges. The high percentage of bridges in the state made this inadequate; hence the additional funds allowed. The first quarter of the present fiscal year was programmed to use $384,000 in much-needed really urgent bridge repairs, but only $125,000 was actually expended because of the impossibility of securing the needed materials for the repairs with the priorities allowed to the states for maintenance operations.

Personnel

The repair of bridges is the responsibility of the Maintenance Engineer, M. L. Shadburn, under the direction of the State Highway Engineer, G. T. McDonald. C. N. Crocker is Bridge Engineer.

Let's all back the attack by buying more War Bonds!

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A New Device for Holding and Placing Dowels and Expansion and Contraction Joints in Concrete Paving:—

POSITIVE . . . Leaves dowels in place with a full-strength concrete slab around them.

MEETS ALL REQUIREMENTS . . . Contractors are using it on Army and State Highway work with outstanding success.

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CATALOG 202 is yours on request. Just off the presses with full data on the complete Duff-Norton line. Write for your copy today.

DUFF-NORTON JACKS "Are Mechanical Muscles" For Every Job of Lifting or Moving

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Winter Maintenance With Plows and Salt

Schoharie County, N. Y., Cuts Costs of Fighting Snow And Ice with Rotary Plow And Rock Salt

By LAWYER WRIGHT, Superintendent of Highways, Schoharie County, N.Y.

✦ WITH more than 1,500 residents of Schoharie County, N.Y., working in the factories of Schenectady on a variety of shifts this wartime winter, it has been more necessary than ever to insure adequate maintenance of the county and state highway networks in this county. The hilly terrain in this area results in severe drifting and, in the past, snow often swept 8 to 10 feet deep in hillside cuts after a heavy storm accompanied by gale strength winds. A generation ago, the problem of transportation under these conditions would have been solved by the farmer's sled. Since almost all commerce today, however, is motorized, the responsibility of seeing that even lightly traveled roads are made passable in short order after a winter storm devolves upon the County Highway Superintendent.

Highway maintenance is a major function of the progressive county today and any comprehensive program for winter maintenance, even with utmost care in effecting economies wherever possible, is a major county expense. During the winter of 1942-1943, the bill for snow work on 389 miles of state and county roads in Schoharie County totaled almost $62,000. None of the county residents, however, questions the wisdom of such an expenditure, because this program has made possible the continuity of business, so essential to our closely interrelated economic life.

In spite of the expense of winter maintenance, however, the County is well within its budget. The County Highway Fund for 1943-1944 totals $113,000, comprising funds from the state, gasoline tax, and its proportion of motor-vehicle registrations. Between $30,000 and $50,000 is allotted for snow removal. Maintenance of the state roads comes under the jurisdiction of the Department of Public Works, but the County Department plows all state roads, as well as county highways, and is reimbursed by the state at the rate of $50 per mile.

Rock Salt for Grades

The standard of winter maintenance has greatly improved since the addition of a Bros rotary snow plow and the use of straight rock salt on all grades.

The salt treatment proved very satisfactory last year when frequent severe ice storms gave it a real test. As soon as there was an indication of glaze from freezing rain, four trucks loaded with Grade CC rock salt started spreading on the hilly sections. These stretches embrace as much as 5 out of 6 miles on some of the county roads. Moving at the rate of about 10 miles an hour, two men spread about ¼ pound of rock salt per square yard of pavement surface as the truck moved down the crown of the road. Within a short time the rock salt melted the ice so that traffic could move safely. The brine prevented refreezing, and consequently made a safer driving surface than if abrasives were applied at intervals as new layers of ice built up.

When rock salt was applied on grades at the start of a snow storm, it also prevented ice from forming and kept snow from bonding to the pavement, after the

(Concluded on page 68)

Schoharie County, N. Y., uses this Bros rotary snow plow for carving through heavy snow drifts on its highways.

"OLD GENERAL IRONGUTS"

Meet General Ironguts, the first General Excavator (shovel) ever built! For 17 years, this tough old baby has been in faithful service, moving several *million tons* of material. When war came, instead of retiring, "Old Ironguts" simply put on an oversize dipper and went to work in *rock* for the Scioto Lime and Stone Company, Delaware, Ohio. There you'll find the work-scarred old timer today, plugging away under the steady hand of Verne Andrew.

Says Verne, veteran of 25 years of shovel operation: "In the last year, we lost only a day's time because of 'Old Ironguts' being down for repairs, and as our General Manager, W. A. Reaney, can tell you, maintenance and repair costs have always been extremely low."

HIGHLIGHT HISTORY OF "OLD GENERAL IRONGUTS"

Built in 1927 as a ½ yard rig

★

In continuous service since original purchase

★

Now equipped with ¾ yard dipper

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Services a No. 7½ crusher plant with a daily output of 300 tons

★

Recently handled 20 truckloads (3½ tons per load) in 65 minutes

★

"Old General Ironguts," and its outstanding demonstration of the dependability of General Excavator equipment will be worth remembering when you can buy your next shovel.

The OSGOOD COMPANY
Sizes: ½ to 2½ Cu. Yd.
Diesel - Oil - Gas - Electric
Associated with The GENERAL EXCAVATOR CO.

The HERCULES COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with The GENERAL EXCAVATOR CO.

GENERAL
Sizes: ⅜-½-⅝-¾ Cu. Yd.
Diesel — Gas — Electric
SHOVELS
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THE GENERAL EXCAVATOR COMPANY, Marion, Ohio

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
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MACHINERY & EQUIPMENT CO., Inc.
Dept. C
36-40 11th St., Long Island City, N.Y.
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Back the ATTACK!

Steel-Concrete Span On Key West Highway

(*Continued from page 7*)

and three of the four were placed without particular difficulty. The fourth, however, acted differently. Half a day was spent in getting it to within 1½ inches of seating. All the next day was spent trying a variety of methods which failed to bring it home. On the third day, ice water was pumped through the 2-inch center bore of the shaft for nearly three hours, the collar was heated at the same time, and the shaft jacked into position about noon.

Steel Piling for Approach Spans

The approach spans are supported on steel A-frame bents, formed by driving 10-inch 42-pound H-beams into the underlying coral rock. Five pairs of the H-beams were used under each cap and were driven approximately 20 feet into the rock by a Vulcan No. 1 single-acting steam hammer. The beams forming each pair were driven with the tops inclined inward on a batter of 2 inches to the foot, with their tops joined together, after driving, by gusset plates welded to the beam flanges. One plumb pile was also driven at each end of the bent. Concrete caps, which were poured encasing the tops of the steel piling, support the outside ends of the deck-girder approach spans.

Treated-timber fenders were constructed on the channel side of both main piers. Each fender consists of thirty treated-timber piles, 28 to 32 feet in length, driven by a drop-hammer with swinging leads. Two 12 x 12-inch ledger timbers 2 feet apart were bolted to piles. A special follower was used which would accommodate both the steel sheeting and the H-beams. Where the wood piling was driven, another follower was used. A Vulcan steam pile extractor was used for pulling the steel sheeting.

Waterproofing

All inside pier walls, the under side of all floors and the outside surfaces of the pier walls to elevation plus five were protected by an application of five coats of water-gas tar, brushed on and allowed to dry thoroughly before the application of the succeeding coat, with one coat of fluxed refined tar for a seal coat. Structural steel was protected by one shop coat of red lead paint and two field coats of black graphite paint.

Major Quantities

The principal bid items, with quantities, are listed below:

CONTRACT ITEMS	QUANTITIES	
Clearing and grubbing	4.92	acres
Regular excavation	13,792	cu. yds.
Treated structural timber	30	MBM
Concrete	1,560	cu. yds.
Reinforcing steel	97,000	lbs.
Structural steel	290,008	lbs.
Machinery and castings	87,000	lbs.
Treated-timber piling	1,000	lin. ft.
Steel H-beams, 10-inch	700	lin. ft.
Waterproofing	1,360	sq. yds.

Personnel

The contract for the construction of the Jewfish Creek Bridge was awarded by the Florida State Road Department to Cleary Brothers Construction Co. of West Palm Beach on its bid of $198,461.49. J. S. Hucks was Superintendent for the contractor and M. V. Moore, Project Engineer for the Florida State Road Department.

Waukesha Appointments

Greatly expanded schedules in 1944, calling for the manufacture of engines and power plants for the armed forces, has resulted in the advancement of Lowell F. Whisler to the position of Manager of Purchases and Expediting and of Glenn R. Evans to the post of Production Manager, the Waukesha Motor Co., Waukesha, Wis., has just announced.

Both men have been closely associated with Waukesha production for a number of years. Mr. Whisler's previous experience included positions with the Haynes Automobile Co. and the Indiana Truck Co. In 1937 he joined Waukesha, where he has served in a variety of capacities, his most recent position being that of liaison officer between Waukesha's production and service departments.

Glenn R. Evans joined the manufacturing department of Waukesha in 1929, having previously been associated with Fairbanks-Morse, Beloit Iron Works, J. I. Case, and General Refrigerating Co. He has held numerous positions in the Waukesha company, including supervision of stores and material distribution and dispatch.

There's no longer any such thing as "waste paper". It is vital to Victory, so salvage all waste paper.

on ROGERS TRAILERS

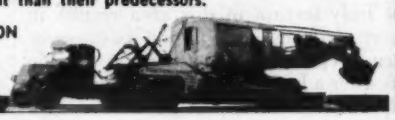
GETTING there "fustest with the mostest" as one early American General aptly phrased it, is battle strategy that really conquers!

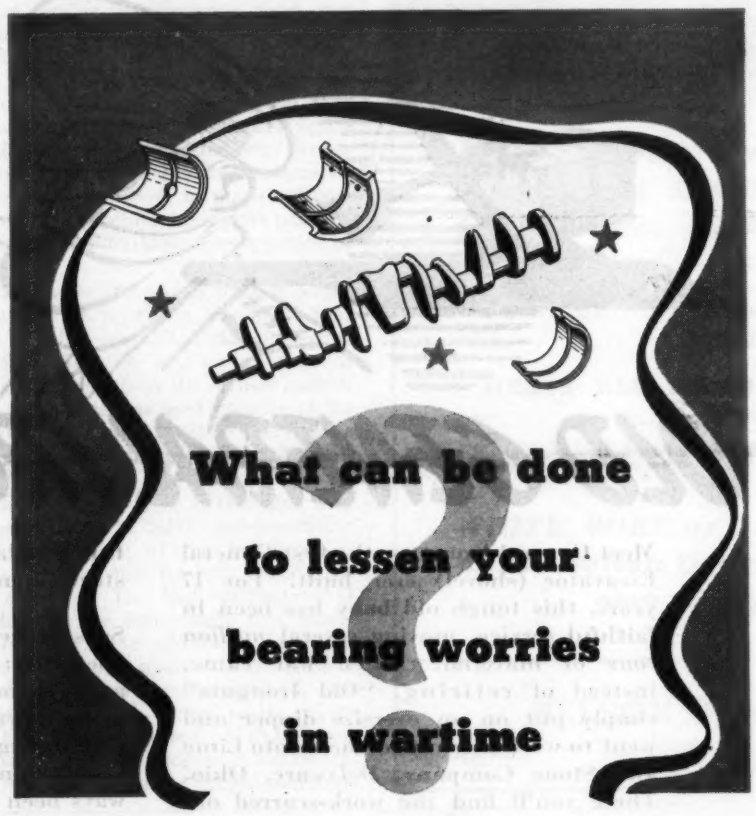
In the lightning speed of mechanized warfare tanks ride "Pick-A-Back" to battle on ROGERS TRAILERS so their fighting capacity is unimpaired. Special ROGERS TRAILERS retreive disabled tanks so they can be repaired and rushed into battle again.

EXPERIENCE builds 'em PERFORMANCE sells 'em

ROGERS TRAILERS are doing a real war job at home and abroad. New models which will be available to industry when war contracts are completed will be even better-engineered and more efficient than their predecessors.

ROGERS BROS. CORPORATION
ALBION,
PENNA.





● THERE ARE many reasons why you may find bearing problems increasing today. Many of the metals which gave prewar bearings long life are needed for the war effort. Many types of bearings now available are not suitable for heavy-duty service. Even under prewar operating conditions these bearings would tend to wear out faster. But today, loads are heavier. Maintenance is more difficult because of the manpower shortage. Longer hours of operation increase the load on bearings. Even prewar bearings are hard put to stand the gaff.

That makes the problem two-sided—how to make wartime bearings last longer, and how to keep prewar bearings on the job.

There is no simple solution. We show at the right a check list of steps that can be taken. While these do not offer new ideas in maintenance practice, they do have *new significance* today. A Standard Automotive Engineer can help you use this list to tighten up your shop practice to secure the utmost protection of your equipment.

A wartime oil for these wartime problems. Two of the most important items on the check list are—"Keep crankcase cleaner," and "Use the right grade and kind of motor oil." Hundreds of fleet operators have been turning to Stanolube H.D. Motor Oil in this emergency.

Stanolube H.D. has been available to the U.S. and fleet operators only since about the start of the war. Although civilian use of this is restricted, it is available to fleet operators because of the vital part they have in the war effort, and because of the severity of the service.

Stanolube H.D. is a detergent oil, but in addition, it is "heat-proofed" to retard oxidation. Therefore, it serves in *two* ways to prevent harmful deposits that cause bearings to wear out more quickly:
1. Because of its detergent properties, it holds fine dust and carbon particles in suspension so that they are removed when oil is drained. 2. The "heat-proofing"—inhibiting against oxidation—practically eliminates trouble resulting from oil oxidation products, another form of deposits particularly troublesome today.

More help on wartime bearing problems. Standard Automotive Engineers are working right now with other fleet operators on bearing problems just like yours. They will be glad to give you the benefit of their experience. You can reach one of these Engineers by calling the nearest Standard Oil Company (Indiana) office, or by writing 910 S. Michigan Avenue, Chicago 5, Ill. In Nebraska, address Standard Oil Company of Nebraska at Omaha 2.

A check list of suggestions for bearing maintenance

1. Use greater care in selecting bearing types and bearing materials best suited to your equipment.

2. Make sure that wartime shop practice gives extra care to proper fitting of bearings as recommended by manufacturers.

3. Check bearings more frequently for wear—an oil leak detector is one easy way.

4. Reduce detonation by:

a. Installing heavier cylinder head gaskets, or two regular gaskets
b. Retarding spark

5. Maintain proper engine temperatures:

a. Low enough to prevent damage to oil and bearings—especially important with wartime bearings—by:
(a) Increasing water circulation
(b) Keeping cooling system cleaner
(c) Keeping crankcase full

b. High enough to avoid dilution and water condensation—by:
(a) Covering radiator
(b) Reducing air circulation
(c) Insulating crankcase

6. Keep crankcase cleaner by:

a. More frequent oil changes
b. More frequent filter changes
c. Proper maintenance of crankcase ventilating system
d. Proper maintenance of air cleaner

7. Use the right grade and kind of motor oil

a. Grade: light enough for adequate cooling; heavy enough for protection
b. Kind: detergent to prevent deposits; stabilized to prevent oxidation and varnish formation.

Oil is Ammunition... Use it Wisely

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

★ FLEET CONSERVATION SERVICE

The new Bruning Model 55C continuous photographic printer.

Speedy Reproductions By New Photo Printer

Designed to take full advantage of the time-saving features inherent in semi-photographic reproduction processes, a new printer for duplicating anything typed, printed, photographed, or drawn has been announced by the Charles Bruning Co., Inc., 4700 W. Montrose Ave., Chicago, Ill. Used with the new semi-photographic materials, this new 55C continuous photographic printer may be used inside or outside of the dark room, and operates with either roll stock or cut sheets. Although a 42-inch unit, it requires a floor space of only 40 x 62 inches, due to its compact design.

With a speed of 0 to 18 feet per minute, the Model 55C embodies improvements in light source and light control which provide maximum line opacity and clear contrasting prints, the manufacturer states. Either of its two fluorescent lamps, one white and one amber, may be used in making exposures, depending on the nature of the originals. A constant-speed motor drives the variable-speed transmission which is controlled by a knob easily in reach of the operator's hands. Speed changes are instantaneous and positive. Further control of exposure is obtained by a shutter arrangement which varies the exposure space from 0 to 14 inches. Both the speed of the machine and the shutter are individually controlled.

In the design of this new printer, care has been taken to provide the good contact necessary in reproducing by a semi-photographic process. A 9-inch Pyrex cylinder revolving contact with twenty-two individual 2-inch bands assures that the originals and sensitive materials remain in register, and prevents slippage which might cause blurred prints.

Another feature of the 55C is the exceptionally large print return tray, which occupies the entire top of the machine. The originals enter the tray on top of the print, for easier handling of the work. The adequately sized feed board is illuminated to facilitate handling, and all controls are individually illuminated by means of ruby or safe lights.

The electrical requirements of the Model 55C are 4 amperes, operating 100 volts. The machine is wired for 100 volts ac 60 cycle, or 220 volts dc.

Further information on the Model 55C continuous semi-photographic printer for reproducing blueprints, maps, engineering drawings and other data may be secured direct from the manufacturer. Just mention this item.

Lumber Industry Facts

The National Lumber Manufacturers Association has just published the 1943 edition of "Lumber Industry Facts" presenting important information on forest industries and the production of lumber and timber products. This third biennial edition contains 78 statistical tables and 23 charts. The table of contents covers: raw material; forest, lumber and timber products; lumber production; lumber shipments; lumber consumption; and pulpwood, pulp, and paper. The book is well cross indexed.

Single copies will be mailed upon request addressed to the Statistical Division, National Lumber Manufacturers Association, 1319 18th St., NW, Washington 6, D. C.

Care of Chain Drives In Wartime Service

"Wartime Care of Chain Belt Drives" is the title of a new booklet, just published by the Chain Belt Co., giving information on maintenance, lubrication and repair of chain belt drives during these wartime days. Chain belt drives, like other equipment, are working longer hours at a harder pace than ever before, and this booklet was issued to help users to get the most out of their existing drives and save some costly delays and unnecessary expense.

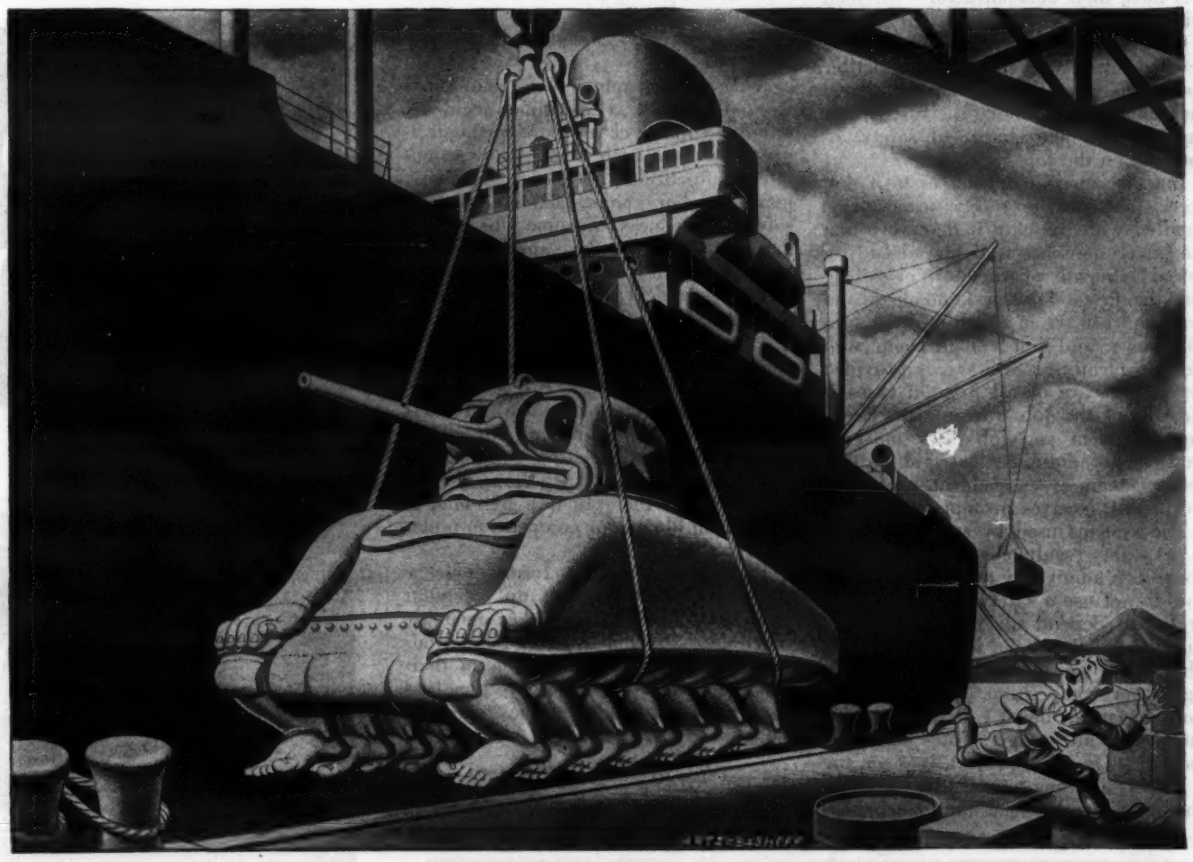
Copies of this booklet may be obtained free of charge direct from the Chain Belt Co., 1666 W. Bruce St., Milwaukee 4, Wis.

GEERPRES
Mop Wringer

reduces mop costs from 25 to 50% over other methods of wringing—retains the mop fabric in a soft fluffy condition most desirable for rapid mopping. No more loose mop strings to catch around legs of desks and furniture when using GEERPRES.

New construction makes this wringer last for many years. Two popular sizes cover the entire commercial field. No. 1624 model will wring mops 14 to 24 oz. incl. No. 2436 model will accommodate mops 20 to 36 oz. incl. SEND FOR FREE CIRCULARS.

GEERPRES WRINGER, INC.
Manufacturers of High Grade Mopping Equipment
MUSKEGON, MICH.



Enlarged reproduction free on request

If this Tank could *talk*...

"Do you know this buddy of mine who's setting me ashore to start erasing Nazis? Let me tell you about him. I first learned what a stout, dependable friend Wickwire Rope is at the mine, where I was just red ore. Then he helped make some of my fine steel parts; and to build me . . . and dig wells for my fuel. In every industry, and on our Liberty Ships, you'll find friendly Wickwire Rope, serving silently and dependably. He'll be serving on the trip to Berlin, too."

• • •

For 122 years Wickwire Spencer has specialized in steel wire and wire products, pioneering many of the industry's important achievements. Wherever quality and service count, that name has won a reputation we aim to continue. Let Wickwire Spencer engineers help on *your* war production—and in your planning ahead.

WILL *YOU* HELP?
Every foot of famous WICKWIRE quality rope is needed to help in vital war production here at home, on the Victory Ships, and at the fronts. YOU can help by making the wire rope YOU use last longer.

FREE BOOK TELLS HOW
Its 82 pages contain:
78 pictures of right and wrong ways
41 wire rope life savers
20 diagrams, tables, graphs and charts
SEND FOR YOUR FREE COPY.

Send your wire rope questions to:

WICKWIRE SPENCER STEEL COMPANY
500 FIFTH AVENUE, NEW YORK 18, N. Y.

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STANDS FOR FRIENDLINESS

Planning for Safety On Construction Jobs

(*Continued from page 25*)

The Plan of Action

On the small and averaged-sized job, which produces the big volume of Austin business, the superintendent is the spark plug of safety. He sells his conviction to every foreman right at the start. The subcontractors catch his spirit from daily contact with him. Workmen on the job are proud to be safe workmen because they know that is what the "Big Boss" expects.

The superintendent holds weekly meetings with his foremen, engineers and clerks, and safety is always discussed. The week's accident experience is gone over in considerable detail; faults and mistakes are frankly discussed; and good words are given for good records. Many of the superintendents have their subcontractors' foremen join in these meetings.

Once a month this weekly meeting is devoted entirely to safety. On the smaller operations, a different man is named each month from among the foremen or engineers to take charge of safety inspection on the job.

But the superintendent sees to it that every part of the safety program is handled with the care it deserves; that the safety signs are well placed and renewed frequently or when torn or soiled; that the first-aid kit is kept clean and neat, and always in a definite and suitable place; and that a small room, well painted, clean and sanitary, is provided for taking care of all first-aid cases if the size of the job warrants it. Every superintendent and job clerk must be qualified to administer first aid, so that between them every accident, no matter how small, receives prompt attention.

The systems used by superintendents to get safety results cover a wide range. Some men admit they are old-fashioned, and do not use a safety engineer. They prefer to depend on personal contact with foremen and the men on the job. They don't go in for graphs and big signs, nor competition. This works in some instances, but it calls for a superintendent who fairly radiates safety all the time. On a big project, it is too big a job for any one man, and on a small one, it frequently makes the superintendent's job a lot harder than it need be.

All tools are carefully inspected every time they are returned to the storeroom or yard on all Austin Co. jobs and then are neatly and safely stored.

Dramatizing Safety Records

The results obtained on many Austin projects prove rather conclusively that some superintendents have been missing a bet in not giving prominence to safety goals on every job by signs or charts showing the daily, weekly and monthly results.

Some use a graph showing man-hours worked without a lost-time accident; others display a chart showing the accidents by trade each week. They stimulate competition between carpenters, masons, labor gangs, etc., and stir up safety-mindedness. On some jobs a green flag is flown over the superintendent's office every day that passes without a lost-time accident; a red flag when someone slips.

The superintendent who is thoroughly sold on safety gets the best results when he organizes for safety, just as he does for any other phase of the work. He sets his goals, stiff ones that call for all-out effort. His foremen are organized; safety engineers and inspectors are appointed; and the job, if a big one, is laid out in blocks for competition under clearly defined rules.

Big signs on which results can be posted regularly are set up. Regular meetings of foremen and key men are scheduled. Special safety regulations are adopted to guide all men in their conduct on the job. There are penalties for carelessness, and traffic rules for vehicles on the site.

Face to Face with Safety

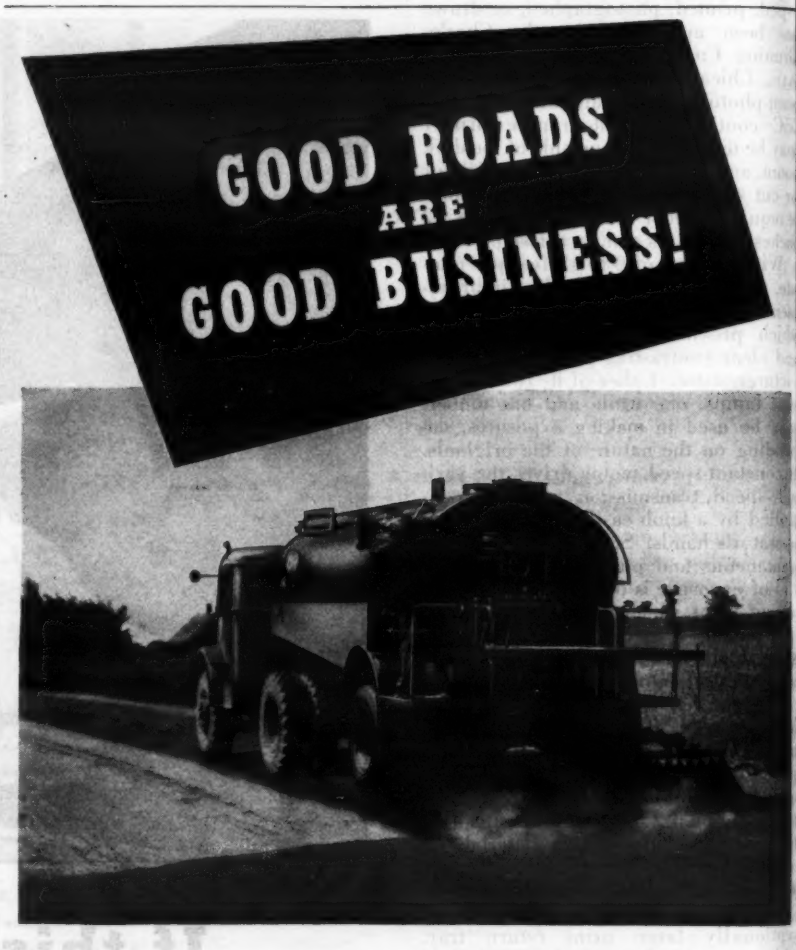
The actual prevention of accidents on any construction job, in the last analysis, hinges directly on the foreman. He sees to it that the men in his gang know how to work safely, and that they realize how much the safety of every man depends on the way in which he and his fellow workers handle their tools and do their work.

When a man starts to work, the foreman explains the company's safety rules along with the duties of the job itself. If the man is new to construction work, the foreman tells him what he needs to know and watch for right at the start, and keeps an eye on him long enough to know that the man is on to the ways of working safely.

The foreman's responsibility for keeping the tools and equipment used by his gang in safe condition goes hand in hand with his job of keeping all of his men alert to safety. It is his business to see that his ladders are sound; that scaffolds, runways and stairways are properly built; to inspect ropes, cables and guy wires to be sure they are in proper condition; and to keep hand tools as well as the larger pieces of equipment in shape for safe as well as efficient use.

If an accident does occur, the foreman sees to it that the injured workman gets immediate and proper attention. No

(*Continued on next page*)



YOU don't need a crystal ball to see that communities which plan now for networks of sound, all-weather roads and suitable airports will be the business centers of the post-war world! And, in many cases, these engineers and public works executives who are energetically setting up post-war programs are leaning heavily on the *flexibility* of bituminous construction. These men have found that bituminous surfaces can be built of lighter weight for low traffic highways . . . or of rugged 11" or 12" thickness to stand up under the shock of heaviest wheel loads or the landing of huge air transports. They appreciate, too, the "seamless" construction, the safety surface, the non-glare, the low cost of building and maintaining bituminous roads and runways.

Contractors who are called in to build these flexible bituminous surfaces will depend upon experience records compiled in the United States during the past several decades . . . by Pan American and Allied armies and navies during World War II . . . and use Etnyre "Black Toppers" for fast, efficient, economical, even distribution of bituminous materials. Complete details about latest model "Black Toppers" are yours for the asking. Write or wire today!

ETNYRE
"Black Topper"
BITUMINOUS DISTRIBUTORS

E. D. ETNYRE & CO., MAIN PLANT AND OFFICE, OREGON, ILLINOIS, U. S. A.

Air-Cooled

Check for
SIZE and POWER
ON YOUR EQUIPMENT

If you are interested in engines . . . either "on the board" for post-war equipment, or "on the job" for immediate applications . . . you can't go far wrong if you include Wisconsin air-cooled engines in your specifications.

The Model VE-4, dimensionally illustrated above, is a typical example of the extremely compact power packages that carry the Wisconsin name plate. This 4-cylinder V-type engine delivers 22 hp. at 2600 rpm. Other Wisconsin air-cooled engine sizes run from 1 hp. to 31 hp. Get our literature and check for *Size* and *Power* on your equipment.

Most H.P. per pound
WISCONSIN MOTOR
Corporation
MILWAUKEE 14 WISCONSIN U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

THE AUSTIN METHOD

Any Job is a Safe Job For Careful Workmen

The Austin Company

Right Kind of Care If Accidents Occur

(*Continued from preceding page*)

matter how small accidents may be, he gets his men to report them, and passes all the information along in a complete report to the man who keeps the job accident records.

Professional Standards in Safety

The Austin Co. has put safety on a professional basis through the work of safety engineers who bring special training, technical knowledge and broad experience in safety administration to every job. A close working relationship is maintained with the traveling and special resident safety engineers of the company's insurance firm. In states where insurance companies do not operate, visits by state safety engineers and safety inspectors open the door for cooperation and advice which is equally helpful in establishing safe working conditions that meet all legal requirements, and more.

On the larger projects, the Austin Co. employs its own safety engineer who gives his undivided attention to safety. As the superintendent's right-hand man, he works in close cooperation with safety engineers assigned to the job by the insurance company, the state or the owner, and carries the Austin spirit into every phase of the safety program.

The Odd Jobs in Safety

The clerk on every Austin job has the fixed responsibility for keeping all the accident reports. On all but the larger jobs, he pitches in on a thousand and one detailed chores which help the superintendent put his whole safety program across. He usually sees that the safety signs are placed where the men will see them and keeps renewing them from time to time.

At the start of the job, he is probably the man who makes the arrangements with the doctor selected for the project and lines up ambulance and hospital facilities. If the job is a small one, he may be the custodian of the first-aid kit, and is ready and able to administer first aid when it is needed. When there is a case for the hospital, the clerk is the logical man to go along, as frequently the superintendent cannot leave the job, and the clerk also gets in touch with the family, follows the case from day to day, and does everything necessary to insure the proper care of the injured man and consideration for his family.

His accident reports are complete in every detail, with the names of witnesses, and an accurate account of every serious injury. If the job is a large one, and often on small ones, the clerk prepares graphs, signs, and statistical reports that show the men and home office alike just how safely they are working.

Right Kind of Care

At the start of every job, the men in charge for The Austin Co. select a doctor whose reputation, ability and accessibility will insure prompt and adequate care for any man hurt on the job. While the insurance company usually recommends someone, in some states, where compensation is provided through the state, the company must make the selection. In any case, the company always satisfies itself that the doctor chosen is reliable, readily accessible, and understands that the injured man's interest always comes first. Although an injured workman is free to ask for any doctor he wants, it is considered sound policy to encourage the use of the doctor who has been selected for the job. In this way, the company can be sure that the man is in good hands and getting the kind of care that will put him back in shape for a prompt return to work.

When the size of the job calls for more than ordinary first-aid facilities, a nurse is provided, either by the insurance company or by the Austin Co. itself. The job nurse is a very important factor in safety, as she can very often encourage the men to bring scratches, bruises, slivers and small cuts to her for dressings, and thus prevent the serious effects and lost time resulting from the neglect of minor injuries.

All Set for Action

If an accident occurs, Austin expects

(*Concluded on page 63*)

PRACTICAL DESIGN for
ARC WELDED Construction
If you are thinking of taking advantage of the new welding techniques together with their lower costs in the Post-War period, you will want these Design Sheets for constant reference. They cover problems from practically every industry from the construction and maintenance fields. You will find many suggestions which can be readily converted to meet your problems. Ask us for them today.
HOBART "Simplified" ARC WELDERS
HOBART BROTHERS COMPANY
Box CE-24, TROY, OHIO
Write Today for Your FREE Plates. No Obligation
HOBART

High Pressure Steam

- Heating Tank Cars
- Thawing Frozen Culverts
- Heating Concrete Aggregates
- Operating Steam Pile Drivers

FULL PRESSURE IN 20 MINUTES FROM A COLD START!

The Bros Tank Car Heater delivers more hot, dry, steam . . . with instant quantity adjustment . . . and greater efficiency, at any rating. It is a complete, self-contained, portable steam generator with oil burning, high pressure boiler. It is engineered for extra heating capacity, long life, low maintenance. Simplicity of design and high operating efficiency make it the preferred Tank Car Heater. (Asphalt Heating Equipment).

Consider these advantages—Full pressure in 20 minutes from a cold start, gives top operating efficiency where quick steam generation is required—only 50 gallons of water per heated car is required, because the Bros Heater uses the condensate returned from the tank car . . . Non-clogging, air atomizing oil burners with constant flame control permit quick adjustment for amount of steam needed to balance any load.

There is no carbon to remove from flues . . . costly pump replacements are eliminated because fuel oil is delivered to burner under low pressure . . . immune to hard water damage . . . low refractory maintenance cost . . . condensate return pump is steam operated, thus eliminating high speed mechanism. The Bros Tank Car Heater is engineered to do a better job at a lower dollar cost.

It is easy to tow at high speeds because of its compact design, low center of gravity, light weight and streamline design.

Write for Test Data—A complete report of tests made on a *non-insulated* Bros tank car heating boiler will be sent on request. They record a boiler and furnace efficiency of 71.8%.

ROAD MACHINERY DIVISION
WM. BROS BOILER & MFG. CO.
Minneapolis, Minnesota

BROS HEATER

An Army "crash" truck, equipped with a Hercules split-shaft power take-off, fights a blaze with 300 gallons of water a minute at extremely high pressure.

Important Function Of Power Take-Off

There are many services which motor trucks can render when equipped with a Hercules split-shaft power take-off in the drive shaft, including the operation of auxiliary equipment on the truck in construction work. One of the latest uses has been to provide the power for the new fire or "crash" truck developed by the U. S. Engineers for use at airfields.

The pump, driven by the truck motor through the Hercules power take-off, delivers water from its 1,000-gallon tank at the rate of 300 gallons per minute and at three times the pressure of ordinary fire engines. Such terrific pressure produces a dense fog which, when distributed through the turret guns of the truck, blasts away the flames and smoke.

Complete information regarding the many post-war applications of the Hercules split-shaft power take-off may be secured direct from the Hercules Steel Products Co., Galion, Ohio, by referring to this descriptive item.

General Motors Plant For Diesel Injectors

A forecast of the place of diesel engines in the post-war era is found in the recent announcement by the General Motors Corp. that the Grand Rapids plant, formerly operated by the Saginaw Gear Division of General Motors, will be a permanent post-war industry. The Grand Rapids plant, which now manufactures injectors for diesel engines and carbines for the armed forces, on January 1 became an independent division of General Motors, known as the Diesel Equipment Division, and will manufacture the injectors for all General Motors diesel engines.

In the past, all injectors for the diesel engines made by the Cleveland Diesel Engine Division, the Electro-Motive Division at LaGrange, Ill., and the Detroit Diesel Engine Division have been manufactured by the latter. Continued increases in the requirements of the armed forces for the products of the Detroit Division resulted in the need for more floor space and man-power, so the injector manufacture was transferred to a separate factory at Grand Rapids. This new move will make possible the eventual return to the Detroit plant of many manufacturing operations which had to be farmed out to other General Motors divisions on a temporary basis during the war emergency.

C. F. Runchoy, Manager of the Grand Rapids Plant, was made General Manager of the new division, and C. W. Truxell, of the engineering staff of the Detroit Diesel Engine Division, became Chief Engineer of the Diesel Equipment Division. He took with him from Detroit a staff of technical and production men.

Plans for the new division promise a continuity of employment at the Grand Rapids plant in the post-war period, and require the post-war construction of a new modern plant designed to meet special problems in injector manufacture.

Actual Size: 80 Pages, 8½x11 Inches

IT'S READY!

Here's the book that engineers, contractors and pump men have been waiting for! . . . the most comprehensive illustrated handbook ever published on construction pumps.

IT'S COMPLETE!

It's a condensed library of pump information. It lists and describes the world's largest line of contractors' pumps—includes a large section of engineering data. It is a book to keep at hand for the solution of pumping problems.

IT'S FREE!

Mailed to any engineer, contractor or pump man. Send the coupon below; your copy will reach you promptly.

MARLOW PUMPS,
Ridgewood, N. J.

Please send me a free copy of the new Marlow Pump Book.

Name.....

Street.....

City.....State.....

COAL STRIPPING with this 12½ yd. WELDED DIPPER

PMCO

reaches a high degree of efficiency because the welded construction of the dipper permits maximum strength with minimum dipper weight.

Welded, box sectioned hood pieces and bail save burdensome weight.

Welded reinforcing body ribs give greater strength with less weight.

We operate the largest and most complete manganese steel foundry in the United States.

PETTIBONE MULLIKEN CORPORATION

Established 1880

4700 West Division St.
Chicago 51, Illinois

Better Bases Built With Selected Soils

Topping and Base Course Total 16 Inches to Allow Subgrade of Plastic Soil To Carry Loads Safely

DURING the summer of 1943, Saunders & Perkins, of Hinesville, Ga., and J. P. McKee of Leroy, Ala., completed 9.08 miles of base course and surface treatment on U. S. 43 running north from Dixons Mills toward Linden, Ala. This is an example of the careful use of local materials to strengthen weak subgrade soils to insure adequate foundations for surface treatments of various types. It is the continuing policy of the Alabama Highway Department to put a larger part of the highway dollar into bases to insure the success of the pavement and provide a safe foundation for future improvement.

On the Dixons Mills job, Project S-157, the subgrade was an A-4 plastic soil for about one-half the length of the contract. Careful testing of soil deposits along the route developed one of a low-grade A-2 silty soil and another of an A-2 sand-clay with a liquid limit of less than 25 and a plasticity index of less than 6. The economy of using these soils, involving only short hauls, to strengthen the foundation course is readily apparent.

The roadway is 32 feet wide between slopes. The topping or transition layer of A-2 silty soil between the subgrade soil and the base was laid full width and 8 inches compacted thickness, followed by a full-width layer of 8 inches of A-2 soil-sand-clay base course compacted in two 4-inch layers to 100 per cent standard density.

The subgrade topping layer was compacted by a sheepsfoot roller pulled by an Allis-Chalmers tractor and finished by a pneumatic-tire roller. It was then bladed by a Caterpillar No. 12 and a No. 10 to a template crown of 3 inches for the 20-foot width to be surfaced. The 8-inch base course of A-2 sand-clay was spread, compacted, and bladed in a similar manner.

At the pits from which the topping and base-course materials were secured, the hauling road was kept in shape for fast movement of the trucks by constant blading by an Adams leaning-wheel grader. To insure as thorough mixing as possible of the materials as taken from the pits, the contractors were required to cut and stockpile them. Then as they were loaded from the stockpiles by shovels, further mixing was assured. If there was need for haste in getting out the soils, the shovel operators were permitted to cut the face and let the material spill through the dipper, which gives much the same results as far as mixing is concerned.

On the road the soils were dumped in windrows of sufficient quantities to give a 6-inch loose, or 4-inch compacted, layer. This was spread by the blades, disked, harrowed, and turned over by the blades until homogeneous and then rolled and bladed to template. This is probably the cheapest type of base construction, and tests show that it provides adequate bearing for the loads it is required to support and eventually makes an excellent base for any higher type of paving that may be placed upon it.

Upon completion of the topping and base courses they were cored every 50 feet for depth, and compaction tests were made at 1,000-foot intervals. Every 250 feet tests were made for quality.

Surface Treatment

Immediately after the completion and acceptance of the base-course section, it was cleared of debris and loose material by a power broom and blower and primed with 0.27 gallon of RT-3. After curing for a reasonable length of time, the surface treatment was completed by an application of 0.40 gallon of RT-12 and 0.42 cubic foot of 5-B slag per square yard. The finish course consisted of a tack coat of 0.08 gallon of RC-2 and 60 pounds of pre-mix seal.

The gradation of aggregate in the mat and seal application was as follows:

Mat Aggregate—No. 5-B Slag

Passing	1-inch square sieve		100 per cent
"	¾-inch " "	70 to 100	"
"	⅜-inch " "	0 to 10	"
"	No. 4 " "	0 to 3	"

Pre-Mix Seal

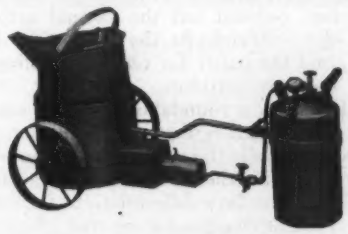
Passing	½-inch square sieve		100 per cent
"	⅜-inch " "	85 to 100	"
"	No. 4 " "	40 to 95	"
"	No. 10 " "	25 to 80	"
"	No. 40 " "	5 to 45	"
"	No. 200 " "	0 to 8	"
Bitumen		4 to 8	"

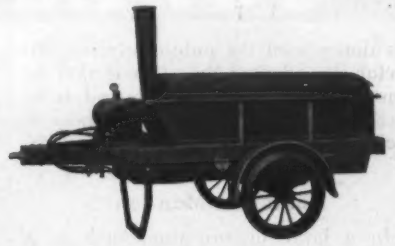
The Alabama State Highway Department has asked us to state that we are responsible for the mention of trade names in this article as "the State did not exercise any predilection in the use of equipment for this project and the kind mentioned just happened to be in use."

Invest in your country's future by buying more war bonds, and keep faith with the men on the fighting fronts.

For speedy heating of tar and asphalt—

Use this CONNERY oil-burning Patrol Patching Heater on the *small* job and this CONNERY oil-burning kettle for *large-quantity* production.

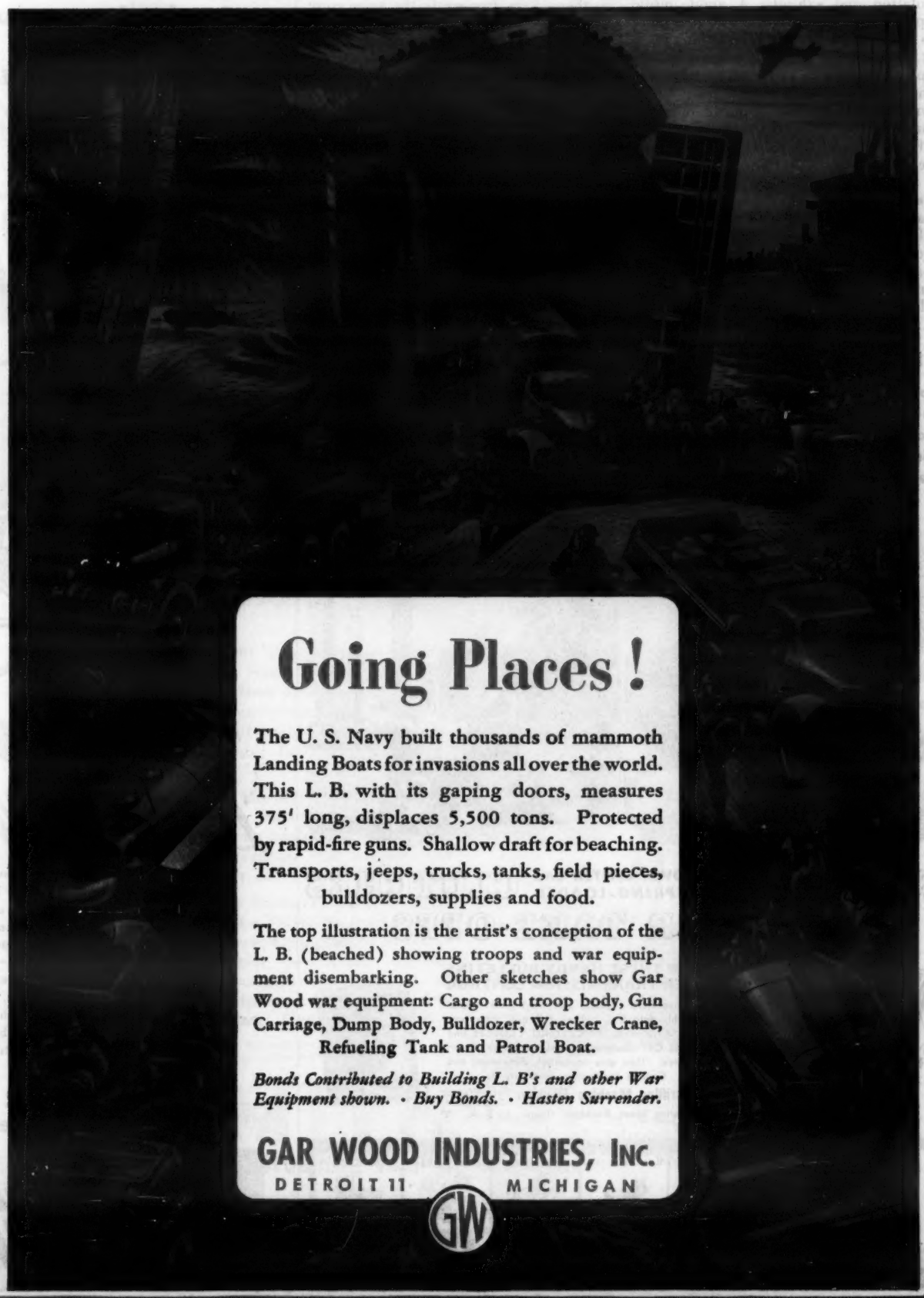




Write for catalog showing our full line of tar and asphalt heating kettles, spraying attachments, pouring pots, etc.

Connery Construction Co.

2nd and Luzerne Streets Philadelphia 40, Pa.



Going Places !

The U. S. Navy built thousands of mammoth Landing Boats for invasions all over the world. This L. B. with its gaping doors, measures 375' long, displaces 5,500 tons. Protected by rapid-fire guns. Shallow draft for beaching. Transports, jeeps, trucks, tanks, field pieces, bulldozers, supplies and food.

The top illustration is the artist's conception of the L. B. (beached) showing troops and war equipment disembarking. Other sketches show Gar Wood war equipment: Cargo and troop body, Gun Carriage, Dump Body, Bulldozer, Wrecker Crane, Refueling Tank and Patrol Boat.

Bonds Contributed to Building L. B's and other War Equipment shown. · Buy Bonds. · Hasten Surrender.

GAR WOOD INDUSTRIES, INC.

DETROIT 11 MICHIGAN

GW

Specialists Needed For Highway Publicity

(*Continued from page 34*)

his duties with the public relations director, he adopted the attitude that he was to call on these offenders and, in as nice a manner as possible, tell them of their error and persuade them to rectify it.

Not a One-Man Job

In a large organization, such as a state highway department, it is futile to expect one man to operate a public-relations program. The old idea of having one man, equipped with a paste pot, scissors and a battered typewriter, tucked away in some remote cubby hole of the building, handling public relations is all wrong.

A completely staffed division should have specialists on newspapers, radio, still and motion pictures, graphic presentation and exhibits. A good public speaker is an asset too . . . . but if there is not one on the public-relations staff, it is essential to have one or more skilled speech writers to turn out speeches for the other men in the department. Letter writing is likewise a public-relations function, particularly correspondence of a controversial nature, or requiring research.

Illustrating the need of specialists, here is a case of how a good newsman can serve a department. The publisher of one of the most influential papers in our state editorially criticized the department. There were many factual errors in his editorials. A natural inclination would have been to call on or write the publisher and take sharp issue with him. However, our newspaperman, who had known the publishers and editorial writers over a period of years, advised against this procedure. Instead, he wrote the publisher a nice letter and, without criticism or condemnation, pointed out the factual errors in the editorial. At the same time he praised the paper for taking an interest in highway activities.

Later, in a roundabout way, it came to our attention that the publisher in question made the statement that he was pleased with the state highway department. The same public-relations formula with slight changes has proved effective on many other occasions.

Wrong to Limit Field

It is impossible to lay down hard and fast rules governing the specific channel of public relations which should be used in every public-relations job. Newspapers, of course, are a potent force in shaping public opinion, and almost every public-relations job must make provisions for getting good copy to them. Very frequently the same copy should be re-worked for use on the radio. In an extended campaign, a motion picture built around the points the public should know about is always effective. There is generally a place too for direct correspondence, for special pamphlets, for public speeches and exhibits to help put across an idea. And it is always essential to have everyone in the organization working for the end to be obtained.

It should be remembered that no one technique or form of public relations will do the job properly. The public relations division should have freedom in using any combination of techniques

(*Continued on next page*)

New Preheater Aids Starting Cold Engines

A new preheater for warming idle cold heavy-duty diesel or gasoline engines to speed up starting is made by the Kimberlin Mfg. Co., South 159 McClellan St., Spokane 8, Wash. This Kim Hotstart may be mounted either beneath or outside the hood of the engine or on the inside of the front bumper and becomes a by-pass to the regular water circulation system of the engine. By controlled percolator-flow action, cold water is drawn into the head of the Kim Hotstart and warm water is forced into the back of the motor block. The intake or valve end of the Kim Hotstart and the outlet point should be as far apart as convenience allows for most efficient circulation. The maker states that this device in no way interferes with the regular circulation of coolant fluids and has the approval of engine manufacturers. The Kim Hotstart is available in two models, gasoline or electric operated, the latter type for use on any convenient 110-volt electric circuit.

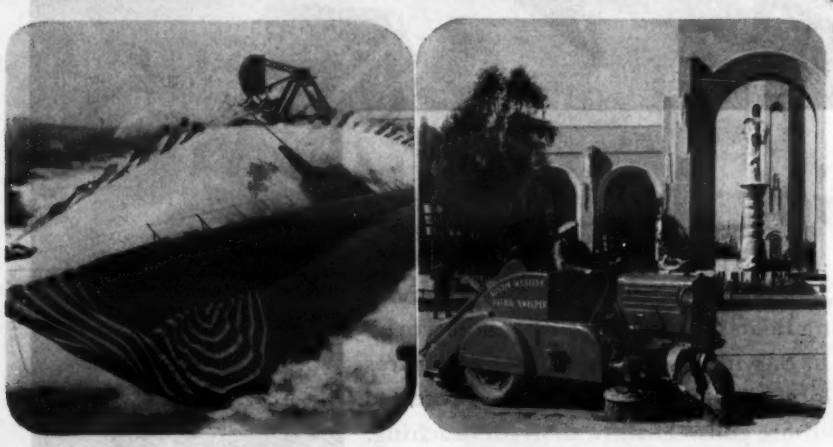
Special brackets are available for the installation of the Kim Hotstart where vibration is present or where solid connections cannot be made. Rubber hose between connections will reduce vibration, while galvanized pipe secures more solid installations. Special flanges and angle elbows are also available at small extra cost.

The manufacturer points out that the Kim Hotstart does not remove the necessity for using anti-freeze in equipment, and also that it does not affect the quality of any type of winter protection. It is also recommended that, when the engine is drained, the Hotstart not be forgotten. There is a convenient plug in the bottom of the aluminum heater tank for that purpose.

A 6-page illustrated folder, containing further information and instructions for installing and using the Kim Hotstart, may be secured by those interested direct from the manufacturer by mentioning CONTRACTORS AND ENGINEERS MONTHLY.

From Submarines to Home Front Machines

Rockford Clutch and Power Take-Off "know how" and production capacity are being used by an ever growing number of manufacturers who are serving the war program or are in essential industries. We are doing our best to keep ahead of this demand for specialized clutches and power take-offs. If your product is in these classifications, or you are planning post-war products, our engineers are ready to work with you to help meet the rapidly changing power transmission needs.



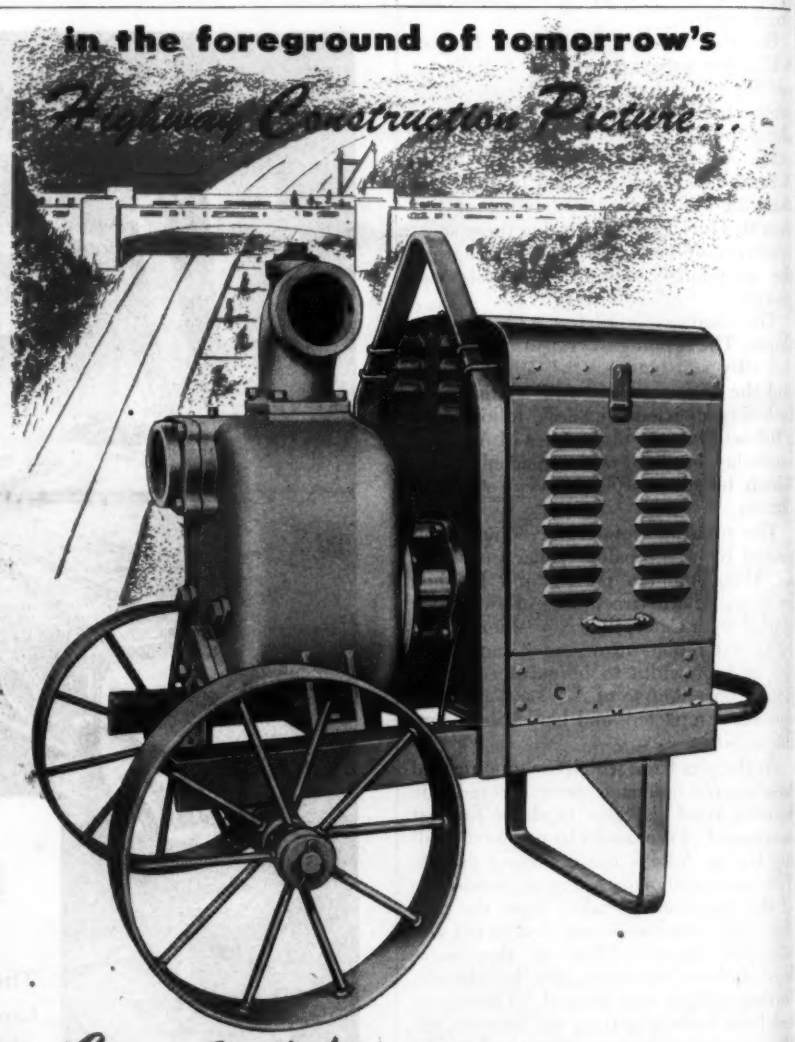
ROCKFORD OVER CENTER and SPRING-LOADED CLUTCHES and POWER TAKE-OFFS

SEND FOR THESE HANDY BULLETINS ON POWER TRANSMISSION CONTROL

Every road machinery engineer will want these helpful bulletins for his data file. They tell and show how our engineers have made ROCKFORD CLUTCH and POWER TAKE-OFF applications that are saving power, time and money. They give capacities, dimensions and specifications. Contain application diagrams, etc.

Rockford Drilling Machine Division Borg-Warner Corporation
▼ 314 Catherine Street, Rockford, Illinois, U. S. A. ▼

in the foreground of tomorrow's Highway Construction Picture...



Low Cost Water - by Carver

• No figures are handy on how many gallons of water have to be moved per mile of highway built, but any roadbuilder can tell you it's plenty. That's why—on tomorrow's competitive, closely-bid highway jobs—you'll find the savings you can make with CARVER *Certified* Centrifugals mighty important items of profit.

From every standpoint—first cost, operating expense, downtime and repairs, and length of useful life—CARVERS cut pumping costs. Fast-priming, efficient, non-clogging and simply designed with extra strength and life in every part, CARVERS get to work faster, stay on the job longer and *get more done!*

Your nearby CARVER distributor will gladly furnish the facts . . . see him soon.

THE CARVER PUMP CO.
Muscatine, Iowa

CARVER CENTRIFUGAL Certified PUMPS

Honesty Best Policy For Public Relations

(*Continued from preceding page*)

that may be necessary to get the job done. It is not the responsibility of the head administrator of an organization to tell the public relations division how the job should be done. All that is required is to tell the division the end to be achieved. Doing the job itself is not an engineering problem, it is a public-relations job.

Working Principles

To get the best results from public relations, the chief administrator of a department should insist upon truthfulness, honesty, interest, and subtlety as the four cornerstones of public relations.

Truth: Always tell the truth. Whether an organization is right or wrong, a truth told will never come back to haunt it. Furthermore, the truth, even though it sometimes hurts, *does* win respect. The truth always makes a *better* story.

Here is an illustration of how telling the truth helped in one problem confronting a state highway department. The Federal Department of Justice was conducting, in the state, an investigation of all public works in which Federal funds had been used. The chief administrator of the highway department was told that it was the policy of the Department of Justice never to issue a story from the scene of its operations while an investigation was under way.

The public relations division took a strong stand, insisting that a public statement be given to the newspapers immediately, rather than attempt to conceal what was going on. The Department of Justice representatives obtained special permission by telephone from Washington, and the highway department issued a statement at once. The story, as it was written, was printed on the inside pages of the newspapers. On the other hand, if the story had been released from Washington several weeks later, even though no guilt was found, it would have created suspicions on the part of the public, and undoubtedly would have made front-page headlines.

Honesty: Another cornerstone of good public relations is honesty. Frequently, newspaper correspondents around the state capitol pick up rumors, grapevine stories, or mere suspicions, and request a statement. The tendency often is to say "no statement" or "no comment" or make a flat denial. Instead, the proper procedure, whether the department is right or wrong, is to dig up all facts and lay them on the table.

In a case of this kind the public relations division itself should not take sides, where public information is concerned. Naturally the public relations man would build a case for the department if that is possible, but there should be no attempt to alter facts or put up a stand when there is none. This attitude gains confidence and often results in the newspapermen bending over backwards to side with the department.

Interest: It is surprising that we do not try to learn more about working with public attitudes from those who know most about the art. No editor in the country, perhaps, has a better sense of public attitudes than DeWitt Wallace of the *Reader's Digest*. He takes no advertising. His magazine sells for 25 cents a copy. Yet he has built up a circulation in excess of 9,000,000, the largest in the world. Seven months after General Mark Clark made his secret mission to North Africa, the *Reader's Digest* devoted its leading article to a detailed account of *how* the mission was planned and carried out. News stories had filled the daily newspapers for weeks on the surface significance of the mission. But the *Reader's Digest* went behind the scenes and presented a step-by-step account of *how* the assignment was carried out.

People like to know these things. There is a lesson here. The completion of a $10,000,000 road project might be worth only a half a column in the newspapers as straight news, but a story of *how* the job was done, properly presented, could be worth a page or a whole series of stories.

Subtlety: As a tool for good public relations, subtlety, properly handled, cannot be overworked. One example of this technique, the case of writing to newspaper publishers regardless of whether they condemned or praised our work, has already been given.

Another example can be cited from radio experience. One state highway department had weekly radio programs on every station in the state. The time was free. Prior to an election campaign, letters were sent to all stations suggesting that the programs be cancelled during the campaign, with the implication that the department did not want to get its programs mixed up with politics.

Frankness and the direct approach disarmed the radio station managers and nine out of ten of them insisted that the

(*Concluded on page 66*)

"CLEVELANDS"

For Superior Ditching Performances!

THE CLEVELAND TRENCHER COMPANY
20100 ST. CLAIR AVE "Pioneers of the Small Trencher" CLEVELAND 17, OHIO
"CLEVELANDS" Save More...Because they Do More

"We're the SEABEES of the Navy
We can build and we can fight"*

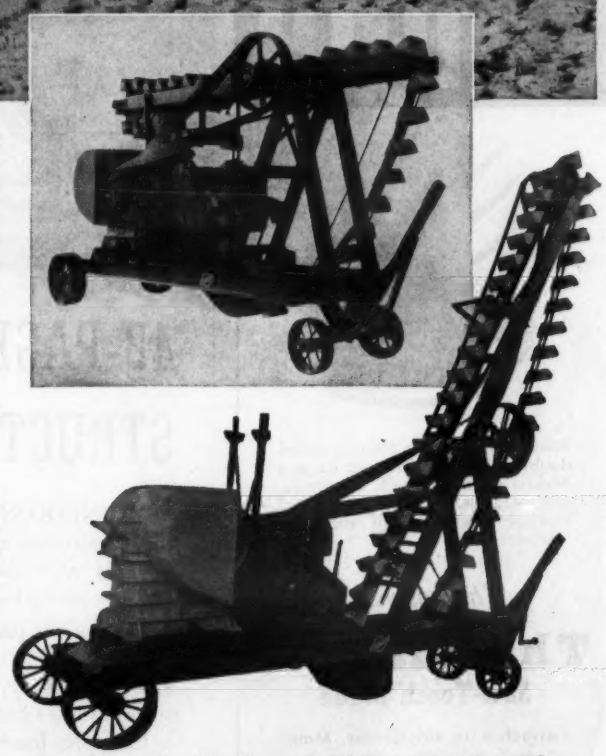
OFFICIAL U.S. NAVY PHOTOGRAPH

Wake Island! Guam! Cavite! Jap bombers roared over our advance Pacific bases . . . Jap warships appeared off shore . . . civilian workers fought side by side with the marines—swinging wrenches, chisels, hammers—in hand-to-hand combat with the Jap invaders. Courage! But courage alone wasn't enough . . .

That was at the start of the war. Then came the Seabees—the Construction Battalion of the U. S. Navy—not only equipped to build, maintain and repair advanced bases overseas, but armed and trained to defend them, too.

And wherever there are Seabees, there's likely to be Telsmith equipment—Telsmith portable or semi-portable crushing-screening plants, or complete large scale aggregate producing plants. Although almost all current production goes to the Navy, Telsmith equipment is available to contractors doing war work. Get Bulletin E-34.

* *From "The Song of the Seabees," copyright 1942 Robbins Music Corporation. Used by permission of Copyright Proprietor.*



Telsmith 10" x 21" General Utility Crushing Plant equipped with Telsmith Roller Bearing Jaw Crusher, bucket elevator and power unit. (Inset shows outfit with elevator folded.) CBP-1

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Brandeis M. & S. Co. Louisville 8, Ky. | Charleston Tractor & Eqpt. Corp. Charleston 22, W. Va. | Roanoke Trac. & Eqpt. Co. Roanoke 7, Va. | Clift L. Priester 911 S. 3rd St., Memphis, Tenn. | Wilson-Weesner-Wilkinson Co. Knoxville 8 and Nashville 6, Tenn.

Official U.S. Navy Photo from Acme
An operations ramp under construction on Attu Island in the Aleutians. A Caterpillar D8 and LeTourneau bulldozer are working in the foreground.

Subgrade Improved Following Break-Up

In 1940 the State Highway Board of Georgia laid a 4-inch road-mixed tar sand-bitminous surface on State Road 32 between Brunswick and Patterson for a distance of 9 miles (See C. & E.M., Oct., 1941, pg. 12). The road was laid with a 6-inch layer of local sand over the gumbo subgrade. This proved to be insufficient, resulting in some failures, totaling not more than 1½ miles, which caused a break-up of the sand-bituminous surface.

The method of correcting these failures has been very successful and is recorded here for the use of others faced with similar difficulties. The subgrade was excavated for 24 inches below the grade of the pavement for 150 feet leading to each break and backfilled with sand so as to raise the grade 18 inches above the old road and across the entire broken section. The top 6 inches was then road-mixed with 4.5 gallons of RC-2 per square yard, using disk harrows and power graders and finally compacted by the equipment and local traffic.

This strengthening of the subgrade by the use of local material and a minimum of labor at very low cost has completely protected the new surface from breaking up. The work was done under the direction of M. L. Shadburn, Maintenance Engineer, and supervised by D. D. Hankins, Division Engineer, with George E. Roberts, Resident Engineer in charge.

New Engineering Manual On Portable Generators

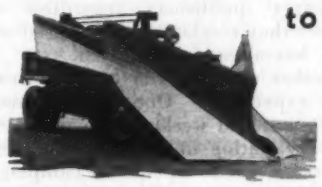
The new well indexed 40-page engineering manual just published by the Master Vibrator Co., is a helpful compilation of data for users of portable gas-electric generating plants. It contains authoritative information on such subjects as power factor, load factor, mixed loads, power calculations, and similar data, written in simple, non-technical language, and is profusely illustrated with photographs, drawings, diagrams and tables. In addition, there are construction views and complete specifications of nineteen portable generator plants, with information on accessories and other Master Vibrator equipment.

Copies may be secured by writing to the Department of Information, Master Vibrator Co., 100 Davis Ave., Dayton 1, Ohio. Just mention this item.

New Sales Executive For Templeton, Kenly

Announcement has been made by Templeton, Kenly & Co., Chicago, Ill., of the appointment of A. C. Lewis, who has been associated with Simplex jacks for more than thirty years, to the position of Vice President in charge of sales. Mr. Lewis, whose appointment became effective January 1, has served as a special representative for Templeton Kenly products in Canada for many years. He will make his headquarters in Chicago but will maintain contact with Canadian distributors through frequent trips to the Dominion.

Open Highways are IMPORTANT to Wartime America



DAVENPORT-FRINK SNO-PLOWS are Doing Their Share

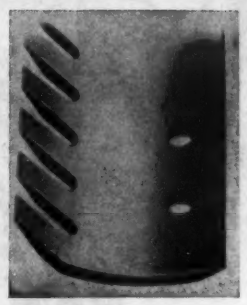
ARMY E NAVY

Order Repair Parts NOW

DAVENPORT BESLER CORPORATION Dept. A DAVENPORT, IOWA

Made in Eastern U.S.A. by CARL H. FRINK, 1000 Islands, CLAYTON, NEW YORK

SHUNK



What Blade is now doing a grand double job of breaking up ice and packed snow on roads in winter, and scarifying, smoothing and leveling highways all the year 'round?

The answer:

The SHUNK Saw-Tooth Blade

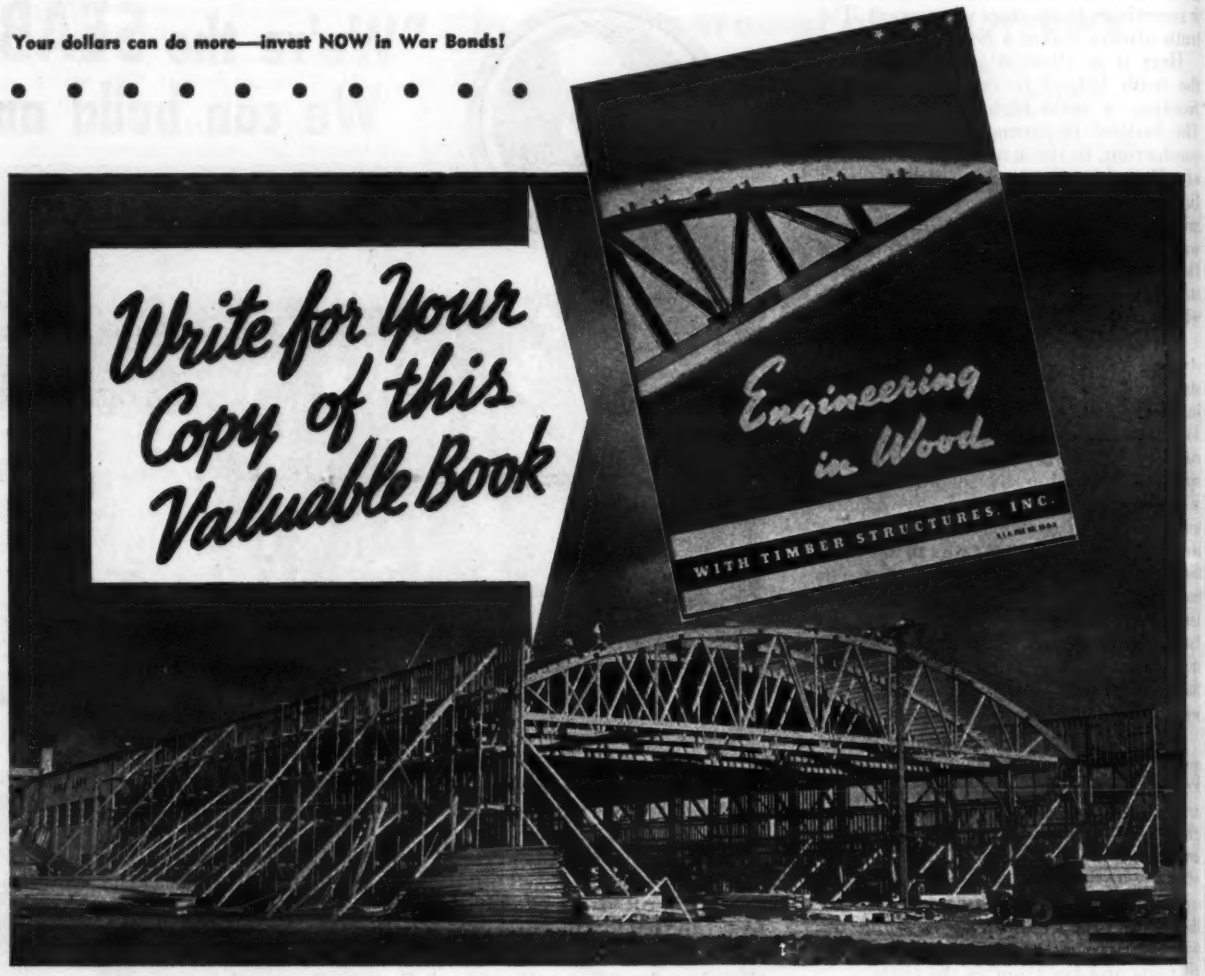
(Attach it to any Grader, Maintainer or Snow Plow.)

The largest exclusive manufacturer of grader, scraper, maintainer and snow plow blades in the world.

(Write for Circular)

THE SHUNK MFG. CO.
BUCYRUS OHIO

Your dollars can do more—invest NOW in War Bonds!



48-PAGE PICTURE RECORD of typical jobs TIMBER STRUCTURES has done for AMERICAN INDUSTRY

"ENGINEERING IN WOOD" is a documented record of the importance of timber in building, and the type and kind of work performed by Timber Structures, Inc. for industry and government before and during the war.

The book is packed with photographic and word illustrations on the use of ring-connected timber trusses, columns, arches, and heavy framing in buildings ranging from small stores to huge industrial plants.

Examples have been chosen from these fields: Aviation, Bridges, Shipyards, Municipal, Industrial, Commercial, Specialties; with a special section on the techniques of Glued Lamination.

Contractors, architects, engineers and plant management men will find

- *"Engineering in Wood"* a worth-while addition to their reference and work files on current and post-war construction planing.
- For your free copy, simply fill in and mail the coupon or send a request on your letterhead.
- Prompt arrival of the book will be insured by addressing the Timber Structures office nearest you.

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If *west* of the Mississippi, send to Portland 8, Oregon. If *east* of the Mississippi, send to 535 Fifth Avenue, New York 17, N. Y.

Care of Cable Marks Efficiency of Operator

(*Continued from page* 31)

on, he knew the wraps would stay true and tight, as long as he permitted no excessive slack. The same rule applies especially to tractors, bulldozers and cable-operated tractor equipment. When the cable is reeved true and tight on the power-control unit, the operator has gone a long way toward getting the most out of his wire-rope steel.

In installing a new cable on a tractor power-control unit, the operator should pay careful attention to which side of the drum he dead-ends the rope. The lead-in should always be right with the fair-lead sheave; otherwise, creasing will occur and a creased cable soon fails.

After the cable is installed properly and wound carefully on the drum, it should never be allowed to go slack. A slack cable will often backlash, causing loose wraps and piling up on the drum. Sometimes after a scraper is dumped, the tail-gate will not return to position. If the brake lever is released, it causes backlashing and crushing of the control cables. The proper thing to do is to hold a strain on the cable until the machine is being loaded again, at which time the inrushing dirt will push the tail-gate back while the cable is still straight on the drum. For the same reason, excessive slack should never be allowed on a cable-controlled bulldozer blade. The slack doesn't help move dirt, and it is certainly destructive to cable.

Some power-control units employ a speedy conical-type clutch which grabs and holds when the lever is engaged. This is fine for fast bulldozing or for accurate control of a scraper where the hoisting speed must be fast enough to pull several parts of line. Where a tractor crane is used on heavy lifting jobs, the operator will find that, if he puts the tractor gears in neutral, engages the track brakes and the power-control unit clutch, and then lifts his load by slipping the master clutch on the tractor, he will not only be treating his cable to less shock loads but also will have much better control of his load during the lift. Using this method, Seabees in the South Pacific regularly load 17-ton water-purification units into flat-bed trucks, using only a very light LeTourneau rear-end crane. They simply hoist the water purifier up in the air, and when it is high enough, they back the truck under it.

Shock loads are hard on wire rope. The operator who jerks a foot of free slack picks up three times the weight of the object he is lifting at the instant the sudden snap hits the rope. It may not break then and there. If the factor of safety is sufficiently high, it won't. But it may start a rope failure, not visible to the eye, deep inside the rope body. Unknown to another operator, this damage may cause failure on another shift. It may cause a man to be injured or killed. It may sabotage the war effort. Most certainly, it cheats its owner out of working hours he has paid for.

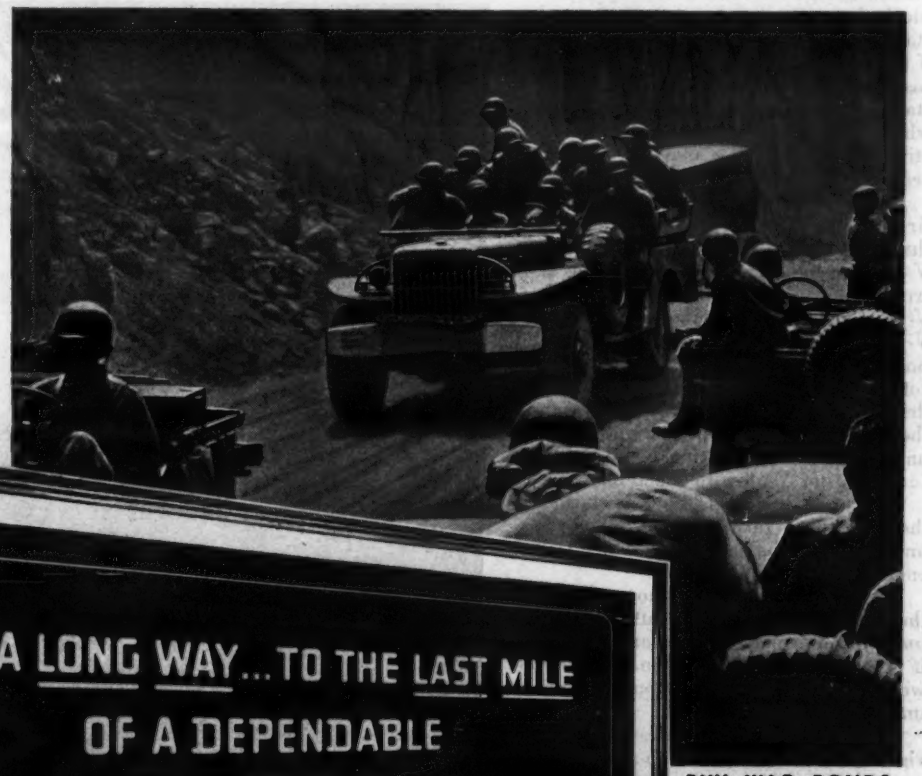
Good Operators

If you ask a contractor who has employed certain operators over a considerable period of time just why he likes these operators, he is likely to give one of three answers. He may say, "Because he knows how to take care of his machines and all its parts," or "Because he moves more dirt than the average operator," or "Because he is loyal". The two second reasons really stem from the first. The operator who keeps his machine in first-class operating condition usually moves more dirt, averaged over the months, than the "grandstander". And if he takes good care of his equipment, it certainly proves his loyalty to his employer.

The good operator works speedily, methodically, and applies his power smoothly, but not so fast that he exceeds the elastic limit of his cable. Good operators know that continual scuffing of a cable over abrasive ground accelerates wear. For that reason, where abrasion is present, Lang-lay cable is used because its wires present about 35 per cent more wearing surface on the outside than regular lay. It is entirely conceivable that a wide-awake operator can save the amount of his wages for months simply by suggesting this type of improvement to his employer. Sometimes, unfortunately, a piece of cable is just a piece of cable to a contractor as well as to an operator.

Wide-awake careful steady operators are scarce. They will still be scarce after the war, even if jobs are no longer as plentiful. The operator who is wire rope's best friend now will probably be the contractor's best friend in the future.

THE OWEN BUCKET CO.
6030 Breakwater Avenue Cleveland, Ohio
Branches: New York, Chicago, Philadelphia, Berkeley, Cal.


ON BATTLE FRONTS . . .

More than 300,000 Dodge-built Army vehicles have been built. Thousands are on battle fronts all over the world. These *dependable* "battle wagons" transport tremendous quantities of troops, guns, ammunition, and war supplies.

Photo taken on Italian highway

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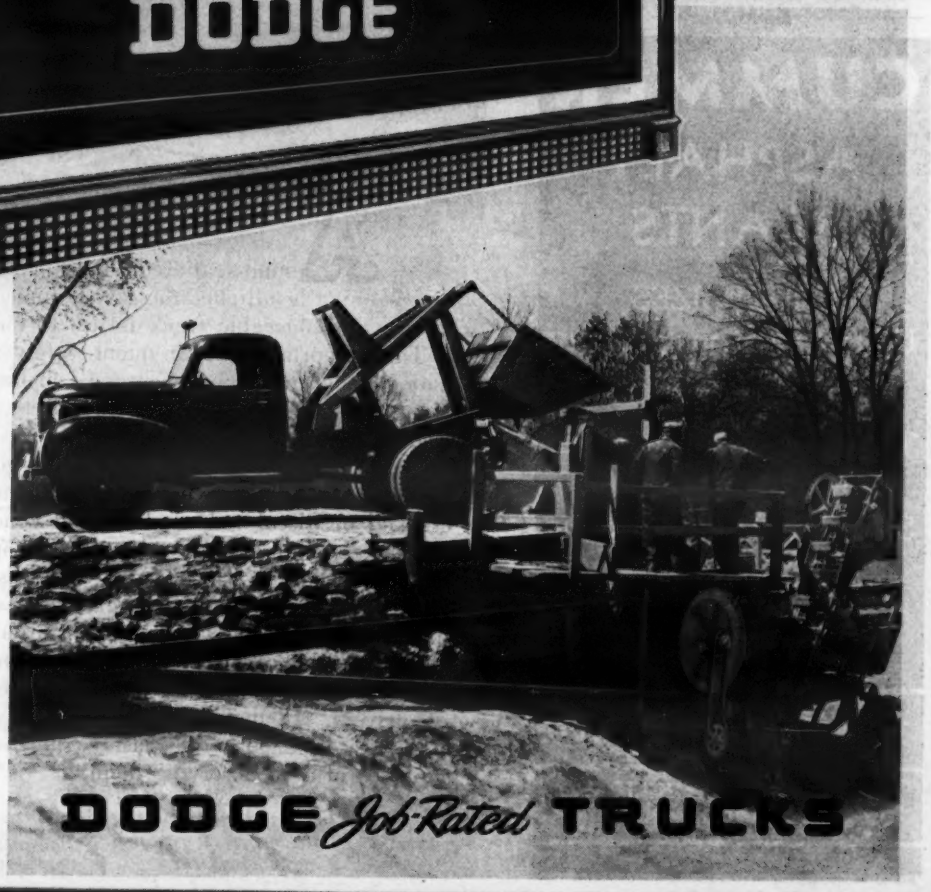


TUNE IN MAJOR BOWES, CBS, THURSDAY, 9 P.M., E.W.T.

Snow-Plow Operations On Roads in Minnesota

(*Continued from page 39*)

with bars and picks before the plows can go through.

When possible, plowing continues throughout the storm, but unfortunately this cannot always be done. Roads may be hopelessly blocked by traffic and the remaining portions be drifted solid before the jam can be cleared and the snow plows get through. The storm can also become so blinding that even the plow drivers, familiar as they may be with their section of road, cannot stay on it and either run off the road and get stalled or have to quit to avoid doing so.

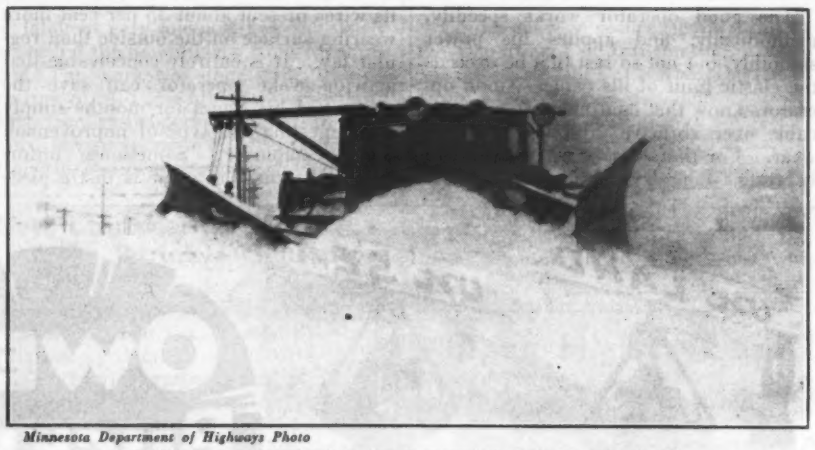
When this condition arises, Mr. Motl believes that a desperate effort must be made to get at least one plow through each road, following a walking guide if necessary, in order to locate cars which may be disabled or stuck but contain human beings. A road once thoroughly blocked may remain so for hours and stalled passengers cannot be extricated if no one knows they are there. Although loss of life seldom occurs to people who stay in their cars, but rather to those who go off afoot in search of help, he still feels that all cars must be located, regardless of visibility.

After a road has been blocked, the first problem is to get a single lane through. This is usually done by a large V-plow on the largest truck available or trucks running in tandem. At times a V-plow and a rotary work as a team, the V-plow, which is faster, going as far as possible and clearing a path for the rotary. When the V-plow encounters a drift too deep or too hard for its power, the rotary goes into action and leads until conditions again make it feasible for the faster V-plow to function.

As soon as the single track is started, the wing plows take over, pushing back and flattening the snowbanks which still encroach on the highway.

There are no established hours during the emergency. Although attempts are made to relieve men at regular intervals, it is sometimes impossible and everyone works with a minimum of food and rest until the roads are open.

On roads with flat slopes and wide right-of-way, the light high-speed one-way plow works best. Where cuts are deep and narrow so that snow has to be pushed back rather than thrown aside, heavier equipment is essential, and with more snow than there is storage space the rotary plow must go through and blow it out.



Minnesota Department of Highways Photo

Drifted snow is moved by truck-mounted V-plows and wings.

While these operations take place on the road, the District Maintenance Engineer and his General Foreman alternate at the District office, acting as the directing head and co-ordinating agency, and shifting equipment and personnel as needed, not only from section to section, but perhaps from district to district with the cooperation of the engineer in charge of another district. If nearby districts are unable to provide needed assistance, he calls the central office and requests that men or equipment be sent in from distant corners of the state. Phone calls reach him frequently as various section men report the condition of their roads, equipment and traffic. One month one maintenance district had a phone bill of over $300, with no individual call amounting to more than 50 cents.

Ice Control

Sanding is almost as important to the movement of traffic as snow removal and even more vital to its safety. All trucks carrying snow plows are also equipped with Briland or Highway sand spreaders and sanding is done promptly whenever the need arises. However the idea is growing in the Minnesota Department that the sanders do too good a job. Sand

(*Concluded on next page*)

A mud-spattered windshield. In the glare of oncoming headlights, the driver missed his turn — and an irreplaceable truck is lost to the war effort.

The importance of frequent safety check-up at major points need not be stressed to fleet operators. Here are some other less obvious safety points, often overlooked . . . .

Be sure fire extinguishers are in good working order and properly located for instant use. Replace cracked or discolored windows and windshields. Be sure directional signals are working properly. Don't set up schedules which call for excessive speeds. Impress on operators the danger of high speeds under today's conditions. If necessary, install governors (available on proper priorities). Don't neglect faulty windshield wipers. Above all, enlist the cooperation of drivers. If they understand the extra wartime importance of observing safety rules, they will be more careful in observing them.

● Our war job is to turn out heavy wreckers and military fire equipment. This assignment requires our all-out effort from a production standpoint. However, our engineers will be glad to work with you now in the development of fire equipment or commercial trucks engineered to your postwar needs.

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Safer Winter Travel Minnesota's Objective

(*Continued from preceding page*)

thrown from a shovel in transverse lines across the road at intervals seems to give equally effective aid to traffic and the sand streaks retain their position and consequent usefulness longer than sand which is uniformly distributed over the icy surface by the sanding machines.

Sand for ice control is taken from local pits in the autumn and stockpiled at convenient points for use during the winter. In one maintenance district a ⅜-cubic-yard Bay City shovel is used to furnish pit-run material to a Coyle Roth screening and loading unit, from which the sand is loaded into Department trucks and hauled to stockpiles after 75 pounds of calcium chloride per cubic yard has been added. The calcium chloride serves the double purpose of preventing freezing of the stockpiles and also causing the sand to melt its way into the icy coating when applied on the road. Its use has interfered with the operation of the sanding machines by damaging electric circuits and has increased the amount of cleaning and engine maintenance needed. Approximately 4,500 cubic yards of sand are used in this typical maintenance district in an average winter.

Closing of Roads

A question being considered in the Minnesota Department of Highways is that of closing roads during the early stages of unusually severe snow storms. It is a well-understood fact that re-opening the roads after severe storms could be expedited if no traffic were permitted to move during its early stages. "Traffic blocks roads more quickly and completely than does snow." Mr. Motl says. If traffic were stopped during the early stages of a bad storm, when it was becoming apparent that traffic blockades might occur, plows could keep operating without being stopped by traffic jams and the necessity for extricating stalled automobiles, and possible loss of life would be eliminated.

While the experienced snow driver scoffs at the idea that he should stop traveling, he should remember that, no matter how expert he may be, he cannot pass a place where less experienced drivers have come to grief and his presence there only adds to the congestion. Persuasion and education have been attempted but many drivers refuse to be deterred and frequently encounter trouble on their journey.

No one refuses to heed a warning that a road is under water and passage is impossible or at least unsafe, but the same driver who would willingly stop for that warning persists in proceeding along a road where snow conditions are equally dangerous and aggravated by his presence. It is likely that at some time in the future it may be advisable to close some roads completely to all traffic during the periods when unusual storm conditions require that the snow plows should have unrestricted use of them. It is expected that this temporary restriction would result in earlier resumption of normal traffic, far less inconvenience to the traveler, and the elimination of a possible major tragedy.

Personnel

M. J. Hoffman is Commissioner of Highways and O. L. Kipp, Assistant Commissioner and Chief Engineer, Minnesota Department of Highways. The men responsible for the successful operation of the Minnesota snow fleet and the safety of the traveling public are, in addition to C. L. Motl, State Maintenance Engineer, and A. H. Merrill, Assistant Maintenance Engineer in charge of equipment, the following District Maintenance Engineers: E. R. Boyce, Virginia; G. M. Christilaw, Duluth; David Rose, Bemidji; Lee R. Boyd, Crookston; H. C. Jahnke, Brainerd; R. D. Jorgens, St. Cloud; P. F. Stary, Detroit Lakes; J. J. Idzorek, Morris; Glenn H. Martz, Hopkins; M. L. Jones, St. Paul Park; M. Brataas, Rochester; E. W. Krueger, Owatonna; C. A. Thompson, Mankato; J. F. O'Meara, Windom; C. A. Swanson, Willmar; F. O. Nelson, Marshall.

Regular lubrication with good lubricants is the major factor in long equipment life. So choose your greases carefully; use them regularly.

MARION CRANES WILL SPEED UP MATERIAL HANDLING
FOR CONTRACTORS AFTER THE WAR
During this war, with MARION CRANES engaged on many diversified construction projects, contractors have had a real opportunity to see them in action. They are "sold" on MARION CRANES, their versatile performance, positive control, accuracy in spotting loads, maneuverability and fast operation, and what these features mean in speeding up material handling after the war.
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DRAGLINE • CLAMSHELL • WALKER
For Every Material Handling Job
¾ CU. YD. TO 35 CU. YDS.

RUD-O-MATIC foolproof TAGLINES

The Rud-o-Matic Tagline is operated on a spring principle and maintains at all times a positive tension sufficient to steady a clam shell bucket under any and all conditions, and will operate perfectly with the boom at any angle. It eliminates all the grief usually encountered with the average tagline as there are no weights, tracks, pins, carriages, or sheaves to wear out or to get out of order. Because of the large bearings and fewer sheaves, the saving on cable alone would eventually pay for it.

Tagline is complete with fair lead and cable attached and can be installed in less than one-half hour. Most of the crane manufacturers have adopted the Rud-o-Matic as standard equipment.

Manufactured by

McCaffrey-Ruddock Tagline Corp.

2121 E. 25th St., Los Angeles

C. & E. M. Photos

A Buckeye trencher cuts the widening trench on an Indiana contract. At left, the insulation course between the steel forms and the pavement being compacted by a Galion trench roller.

War-Traffic Routes Salvaged in Indiana

(*Continued from page* 40)

front and rear wheels of the truck to the outer corners of the spreader box. The spreading crew consisted of one man who rode the box at the outer or spreading end, one man at the rear, and one man on the other end shoveling from the truck into the box, one man sweeping material from the pavement onto the widening strip, a raker, and a foreman. The box carried a half drum with kerosene for the men to use to prevent the hot-mix sticking to their shovels and rakes. The hauling trucks were all equipped with a wooden baffle in the back of the body to direct the hot-mix to the side of placing to lessen the need for shoveling.

The forms could not be removed until the following day, although the pins were pulled the evening of placing. This was necessary because the hot-mix base material, before it had cooled, would start to slough off into the trench. As soon as the forms were pulled, the form trench was backfilled with the dirt which the trencher had deposited on the shoulder. It was rolled against the widening strip in two layers of equal depth by running trucks of not less than 4-ton capacity over the trench. Any earth remaining after the trench had been backfilled was wasted along the shoulder by a blade grader to fill low spots but in no case to bring the shoulder above the state specification of a slope of 1 inch per foot. Excess dirt that could not be disposed of in this manner was hauled not more than 2,000 feet and distributed on the shoulders or wasted at least 300 feet outside the right-of-way.

Asphalt Plant

The contractor set up his own asphalt plant about 2 miles off the job, giving an average 7-mile haul. The plant consists of a Cummer hot elevator and mixer and a Hetherington & Berner drier which the contractor has assembled in a novel manner to permit ease of moving, speed of assembly, and economy of man-power in operation. The plant was brought in by truck and assembled in three days, with a 10-B Bucyrus-Erie crane handling even the 6-ton screen assembly for the top of the plant.

Both coarse and fine aggregates for the mix were delivered by hopper-bottom freight cars and dumped into separate pits beneath the tracks of the spur behind the plant. A Byers crane with a ¾-yard clamshell unloaded the material from the pits to stockpiles or direct to the Hetherington & Berner 2-compartment bin which fed the cold elevator through reciprocating feeder gates.

Storage for 50 tons of asphalt was

(*Concluded on next page*)

New Spudder for Dredge Made of Lumber and Glue

Glue lamination has made possible many types of structures for the war effort, and recently another new use for this type of fabrication has been announced, in the construction of a huge spudder for the General Construction Co.'s big Columbia River dredge.

Laminated by Timber Structures, Inc., of Portland, Oregon, the spudder is 85 feet long and 30 x 30 inches. In its fabrication, 10,345 fbm of kiln-dried lumber and 320 pounds of Lauxite urea resin glue, made by I. F. Laucks, Inc., Seattle, Wash., were used.

This technique of compounding large structural members, such as arches, trusses, beams, and columns, from smaller sections of wood and glue affords a larger member than would ordinarily be obtained from single timbers and it is reported that greater strength is achieved in a wood-and-glue unit than in an all-wood unit of the same size.

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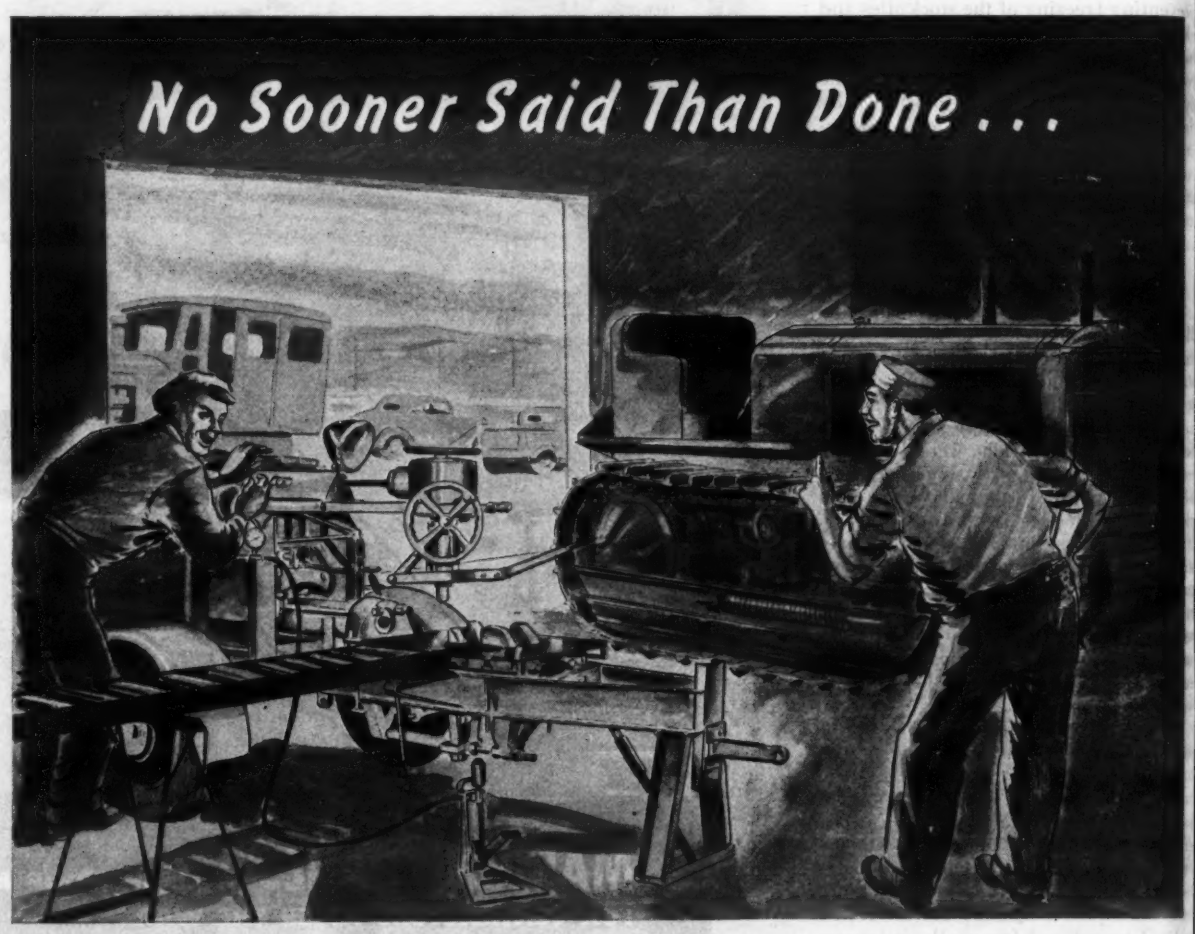

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POWER TRACK WRENCHES
HYDRAULIC PLASTIC PRESSES
PORTABLE STRAIGHTENER FOR PIPE AND KELLYS

Keeping your crawler tractor going without loss of valuable man and machine hours is a mighty important job in these critical days.

Superintendents and foremen in the largest and most modern tractor repair shops praise Rodgers Hydraulic Track Press. Throughout the United States and Canada, tractor dealers are showing a preference for Rodgers, as it has the Power, Speed, Durability and Safety which service men appreciate.

Now that new tracks are hard to purchase, dealers everywhere are turning to Rodgers for the best in track servicing equipment. Our latest catalog describing the Rodgers Hydraulic Track Press —the best—is yours for the asking. Rodgers Hydraulic Inc., St. Louis Park, Minneapolis 16, Minnesota.

"Any good 'Track' Man will vouch for Rodgers We couldn't keep 'em rolling without it!"

Rodgers HYDRAULIC Inc.

Highways in Indiana Widened by Contract

(*Continued from preceding page*)

provided in two tanks and another held 20,000 gallons of fuel oil for the operation of the Hetherington & Berner drier. The Cummer pugmill mixer was driven by a Caterpillar Fifty tractor through a belt. A Waukesha gasoline engine furnished the power for the drier, feeder, and cold elevator. The plant was rigged for one-man operation of the aggregate weighing as well as the asphalt weigh box and the dumping of the batches after the 1½-minute mixing. The aggregate cars were moved on the spur track by the Byers crane. The asphalt was heated in the cars and storage tanks by a horizontal boiler which also provided steam for the operation of the pugmill gates to drop the 1,800-pound batches into the hauling trucks, and for the steam-jacketed lines to the tank cars. The asphalt was pumped from the tank cars to storage by a Kinney asphalt pump, and a Viking pump was used to circulate the asphalt from the storage tanks through the loop from which the material was drawn off for the weigh bucket.

The 1,800-pound hot-mix batches were made up as follows by weight:

Sand	30 per cent
Coarse aggregate	65 per cent
Asphalt	5 per cent

The plant was operated 12 hours a day to put out the required daily minimum of 400 tons of bituminous mixture for the widening. A fleet of nine trucks hauled six 1,800-pound batches per load, with the weighed batches covered with tarpaulin to conserve the heat.

The asphalt plant, laboratory, storage tanks and platform scales were strung out for a considerable distance on a 100-foot right-of-way but with the minimum of waste in layout, considering the narrow plot available. A shop mounted on a 4-wheel trailer provided the repair department for the job. Shelves and benches around the inside of the body made possible the storage of parts and provided space for work in inclement weather. The mechanic pulled out the forge, anvil, and acetylene welding equipment and set them up outdoors for work during the summer.

Quantities

The project reported in this article consisted of two contracts, M-2311 and M-2322, for 19.64 miles of bituminous widening only. The quantities for the contracts were as follows:

Item	M-2311-2322
Bituminous material for seal	4,500 gals.
Subgrade fine aggregate	1,500 tons
Bituminous concrete (AH) base and binder	20,750 tons
Covering aggregate	150 tons
Rock asphalt	1,560 tons
Contract price	$170,805.00

The price per ton for the base for widening in place covered the furnishing, hauling and placing of the material, the excavation and backfilling of the trench, priming the edge and preparing the subgrade, disposal of all surplus excavated material, as well as labor and tools. The price paid for subgrade aggregate covered the furnishing, hauling, spreading, and compacting of the material as well as the required extra excavation for the insulation course.

Personnel

Contracts M-2311 and M-2322 for 19.64 miles of widening were awarded to Brooks Construction Co. of Fort Wayne, Ind., at the letting of August 25, 1942, by the State Highway Commission of Indiana, Samuel C. Hadden, Chairman. The contracts were operated under the direction of John Brooks, President, with Frank LaBarbera as Superintendent. For the state, the work was done under the direction of the Division of Maintenance, Norman F. Schafer, Superintendent of Maintenance, with Lee Wetzer as Project Engineer.

The millions of volunteer donors who have visited American Red Cross blood donor centers have helped save the lives of great numbers of our soldiers and sailors. These centers are equipped with up-to-the-minute scientific apparatus, and their operation is financed from Red Cross funds. Support the 1944 Red Cross War Fund and thereby help save the lives of the boys at the front.

C. & E. M. Photos

A Jaeger widening spreader box placed the first 3-inch layer of hot-mix base in the trench, after which a Galion trench roller compacted the bituminous mix on an Indiana road-widening job, as shown at the right.

Remember—
THEY AREN'T LICKED YET!
Brilliant United Nations victories in Europe and in the Pacific are only a beginning—the costly struggle lies ahead. Money, equipment and men are needed in increasing quantities and numbers before complete and final victory is ours. Remember, the enemy is powerful—they aren't licked yet! So don't relax now—
BUY MORE WAR BONDS THAN YOU EVER BOUGHT BEFORE!
• The test of war is resulting in Michigan Mobile Cranes and Shovels with features more outstanding than ever . . . These new MICHIGANS will help you to greater profits after victory . . . For complete information write for Bulletin E-14.
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Storing Truck Tires Awaiting Recapping

The importance of protection for tires which are to be recapped or repaired later is stressed by L. H. Taylor, Truck and Bus Tire Department, B. F. Goodrich Co., Akron, Ohio, in a recent issue of "The Rubber News Letter" issued by that company. Mr. Taylor points out that many people leave such tires in the open with no protection from the weather.

While the tread and sidewalls of a tire and the rubber covering of the cords on the inside of the tire help to protect it from water, almost all truck tires which have been used for sufficient time to be worn to a point requiring recapping have been cut or punctured so that moisture entering the injury can damage the cords of the tires. It is likewise true that most repairable truck tires can be similarly damaged.

Moisture entering the tire in this manner may reach a point some distance away from the injury, since it will travel along each cord much like water entering a tree at its roots and traveling up the tree trunk to the leaves. When the tire is then sent to the recapper or repairman, all of this moisture can seldom be taken out of the tire by heat before the work is done. While some recappers have drying rooms in which they store tires for a period of time to try to eliminate moisture, if it has traveled deep into the tire, it is almost impossible to eliminate all of it. Furthermore, most recapping plants do not have drying rooms.

When a tire containing moisture is being recapped, new rubber is applied to it and the tire is put in a mold for curing. The high temperature of the mold causes any moisture remaining in the cord body to turn into steam. This will result in separation in the plies of the tire, since they will be forced open by the steam pressure.

In most instances, this occurs while the tire is in the mold and can be readily detected upon its removal from the mold. But the tire is ruined, thus resulting in a needless loss of the tire as well as the loss of the recapping rubber. If the separation, occurring while the tire is in the mold, is slight, it may not be found on inspection after the work is completed, and the tire will probably fail quickly after it has been put back into service. Repairable tires may be damaged in a similar manner so that the repair fails quickly.

The rules on proper storage of new tires apply equally to tires which are being saved for recapping or for repair. Listed below are five rules which should be followed to eliminate, as far as possible, the chances of tire deterioration, damage, and later failure because of improper storage.

1. *Light:* The storage room should be dark, or at least have a complete absence of direct sunlight. If there are windows, they should be painted with blue paint which provides indirect lighting in the daytime which is not injurious to rubber.

2. *Temperature:* Low temperatures are not objectionable but high room temperatures, over 80 degrees F, are detrimental and should be avoided.

3. *Oil:* Care should be taken that tires do not come in contact with oil in any manner. A common failing is to lay them on oil-soaked floors. This should be avoided. Oil is a natural enemy of rubber and causes it to disintegrate rapidly. If a tire which has been oil-soaked is recapped, it is much more likely to fail.

4. *Moisture:* Moisture should be avoided and tires stored indoors, out of the weather. Care should be taken, even in-doors, that there is not a leaky roof, water pipe, or other condition which may permit moisture to enter the tires.

5. *Air:* A strong air current should be avoided, as this increases the supply of oxygen.

In view of the serious shortage of new truck tires, it is important that every repairable or recappable tire be stored properly so that it can be continued in service. Following these simple preventive-maintenance measures will help to save tires and keep present equipment in service.

Wire-Screen Bulletin

Roebling woven-wire fabric for vibrating and rotary screens used in sand and gravel plants is described and illustrated in a 4-page folder issued by the John A. Roebling's Sons Co., Woven Wire Fabrics Division, Trenton, N. J. This wire screening, made from high-grade metals to withstand wear and abrasion, is available in a complete range of sizes.

Copies of this folder may be secured direct from the manufacturer.

a tire is thicker in the tread, a gun is thicker in the breech, this shovel is 60% thicker up the center than at the sides

Strengthens *ALL* Points of Wear and Strain *

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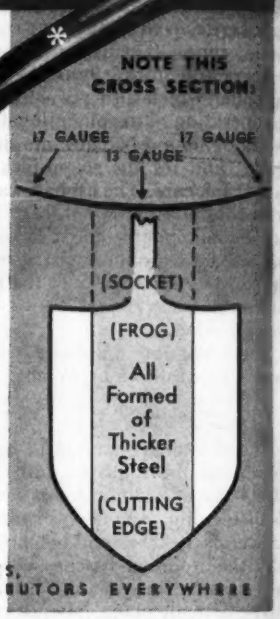

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● REILLY BITUVIA is especially adapted to war-time construction, maintenance and repair work. It is quickly applied, penetrates deeply, and binds the aggregate firmly. The resilient, skid-resistant BITUVIA surface reduces accidents, and contributes to longer tire life. The road shown above, which carries heavy traffic into and out of a large midwestern war plant, was constructed *entirely* of BITUVIA. First the road was stabilized with heavy aggregate and BITUVIA RT-6. Second, the wearing surface was applied, using medium aggregate and BITUVIA RT-9 (a pre-mix cold application material). The third and final step was a seal coat of BITUVIA RT-11.

BITUVIA is available in standard grades to meet all specifications

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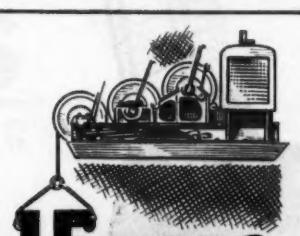
Takes the "IF" out of LIFTING



There are a lot of mighty big IFs in every Lifting Job. IFs that can cost you time and money. "If this," "If that" . . . . they can all mean trouble IF you don't have the right equipment!

A Novo Hoist will eliminate most of these IFs. Novo Hoists are rugged, sturdy, and built to stand the gaff. They have ample power, and are job-designed and field-proven. Novo's complete Line of Hoists ranges from 1,000 to 8,000 lb. capacity. To take the IF out of your Lifting Job, get a Novo Hoist!

You don't need a "pull" to get the latest information on Novo Hoists. Just fill in the attached coupon.

Also a member of A.E.D.

NOVO ENGINE COMPANY LANSING, MICHIGAN

Austin Co. Photo

A new type of safety ladder developed by the Austin Co. Made of laminated 1 x 2's for the uprights, and 1 x 4 rungs secured between chalks and covered by a thin nailed strip, with bolts extending through the uprights on each side of each rung, these ladders are about the same weight as the ordinary type used on construction jobs but have proved to be nearly twice as strong.

Study of Accidents To Make Jobs Safer

(*Continued from page* 51)

the injured man to receive prompt and effective aid. This demands an understanding of basic first-aid principles by men on all parts of the job. Everyone should be familiar with the facilities provided for the treatment of injuries on the job, even if they are no more than a first-aid kit in the hands of a well-trained and experienced first-aid man at the job office.

Whether the job is a large one, with a central hospital and first-aid stations at different points over the site, or a small one, the men in charge of accident work know what to do. If the injury is minor in character, they administer the required first aid; if the injury is more serious, involving deep cuts or punctures, they see to it that the man gets to the doctor with all possible speed. If broken bones or internal injuries might be involved, they send for a stretcher and ambulance and make the man as comfortable as possible without moving him until the ambulance arrives. Standing arrangements with the nearest ambulance service and the hospital located closest to the job insure prompt handling of all cases requiring such care. Someone, usually the clerk, is always available to go along, to look after the personal wants and get in touch with the family of the injured man.

Where the size of the job justifies the employment of a special first-aid man, nurse or doctor on the site, they are responsible for handling all accidents and have the full cooperation of the job organization. In all other cases, the primary responsibility is centered in some designated person in the superintendent's office.

It is a company rule that no matter how small the accident or how slight the injury, it must be immediately reported so that first aid can be given. It is important that full and complete information on conditions surrounding the accident be provided with the original accident report, together with statements from all available witnesses. This information is essential for the preparation of reports required by the insurance companies and state compensation boards, and a study of such information will help to prevent a repetition of such accidents. The more complete the report, the easier it is for the injured man to get the best medical attention and the fairest and speediest adjustment of compensation, and the more helpful it will be to the safety men on the job to correct the conditions which caused the accident.

Report on Expenditures For Oklahoma Highways

According to a recent report of the State Examiner and Inspector of the State of Oklahoma, a total of $213,752,691 has been spent for the construction of 9,274 miles of highway in Oklahoma between December 1, 1918, when the State Highway Commission was created, and July 1, 1943. Of this sum, the counties contributed $33,622,630.

Highway Department figures show that, of the 9,274 miles of state highway, a total of 5,981 miles, including both rural and urban, are all-weather, surfaced with bituminus topping or better. Of the total, 8,785 miles are outside of cities and towns and, of this mileage, 5,545 are all-weather roads.

Maintenance costs have averaged about $3,000,000 a year, while administrative costs for the year ending June 30, 1943, were $900,000, a decrease from the average costs of the last ten years.

The same audit shows that Oklahoma County has spent $6,637,442 for construction, which includes $1,448,061 of county highway funds. In Tulsa County the construction costs total $6,903,210, of which $1,718,971 was county highway money.

The reports for other counties near the state capital are: Canadian, a total of $4,981,062, of which $775,914 was county money; Cleveland, a $932,222 total, of which $14,889 was county money; Lincoln, a $4,188,197 total, $939,416 county money; Logan, $2,494,292 total, $583,885 county money; McClain, $2,989,453 and $125,038; Garvin $2,639,740 and $10,170; Payne, $3,599,971 and $1,035,893; Grady $3,847,414 and $461,464; Caddo, $4,701,268 and $857,328; Kingfisher, $2,467,714 and $312,346; Creek $4,644,057, and $1,238,437.

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are weight-proportioned to sink their husky teeth in—and power-reeved (up to 7:1) to dig down for a heaping payload at every grab. Ask any crane operator!

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This spring-cushioned towing eye is just one of several Le Roi features which enable you to get air for a job in a hurry, with minimum time lost on and between jobs. Truck-type springs — retractable caster wheel — quick starting at the press of a button — all help your record for fast performance. Ask your Le Roi dealer about maintenance service—also about new Le Roi compressors available with adequate priorities.

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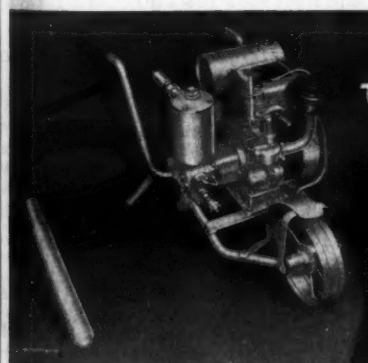

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Used 12 lb. double-faced standard makes Sledge Hammers with handles, $12.00 per dozen.

Also 5-½" x ¾", 5-½" x 2" and 4-½" x 2-½" Brass Reducers for Fire Hydrants—50% off list price. And Cast Iron Fire Hydrant Plug Covers—50% off list price.

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Salary or commission basis.

Give full information regarding past experience, territory covered. Personal interview will be granted by Sales Manager to all replies.

Box 244: Contractors and Engineers Monthly
1715 Daily News Building
Chicago 6, Illinois

Inland Water Route Is Widened, Improved

(*Continued from page 17*)

inghouse 175-kw generator at 600 rpm supplying 250 volts at 700 amperes for additional cutter power when necessary.

The swing engine has a 60-hp 230-volt 212-ampere Westinghouse motor running at 850 rpm. The seven-part forward winch, controlled from the operator's house above, consists of the port spud hoist, port anchor hoist, port swing-line hoist, the cutter hoist, the starboard swing-line hoist, the starboard anchor hoist, and the starboard spud hoist.

A pair of 200-hp enclosed motors with a Falk single-reduction unit is used to drive the cutter head carried on a 75-foot ladder which can dig to a depth of 50 feet. The cutter is 6 feet in diameter. The main pump produces a vacuum of 20 inches in sand and 12 inches in clay, while the pressure on the discharge line is 30 pounds in sand and 40 pounds in clay. The cutter shaft has a 15-degree angle at the cutter-head end to prevent dragging when working in shallow water. For a portion of the work, where the canal was being widened, the cutter head actually worked part out of water at the side top cut.

Plant maintenance equipment aboard the Tchefuncta includes a P & H-Hansen electric welder, an overhead crane with a 2-ton Wright hoist running along the starboard side within the housing, a gas welding outfit on the port side, an 18-inch x 8-foot Rahn-Larmon lathe, a power grinder with Norton wheels, a work bench, a Buffalo Forge Co. No. 121 drill press driven by a Diehl 3-hp motor, a pipe vise, and a machinist's bench with two heavy-duty vises.

Two interesting facts about the Tchefuncta are the wooden hull which, in the best tradition of our wooden ships, was well scrubbed, and the effective wartime disposal of table refuse. A pen of pigs was housed on the last pontoon away from the dredge, offering a good example of salvage and also furnishing, upon occasion, some fresh pork for the crew. Captain A. Andersen is master of the Tchefuncta.

The Steam Dredge Mobile

The steam hydraulic dredge Mobile, owned by the Atlantic, Gulf & Pacific Co., of New York, has a 29-inch suction and a 22-inch discharge with a 65-foot ladder enabling it to dig to a maximum depth of 40 feet with its 6-section scalloped-blade cutter head operating at from 25 to 31 rpm. The Mobile worked with a 1,000-foot combined pontoon and land line, with landing lines set up every 800 feet ahead so as to minimize the time required for shifting the pontoon line and cutting in and out. This dredge does not carry anchor booms on the main hull, but uses a derrick boat with a 12-ton derrick. A Hercules gas engine operates the double-drum hoist for setting the land anchors for swinging.

The power plant is a large Foster-Wheeler oil-fired boiler which replaced two of the four original Heine water-tube boilers. The boilers carry 200-pounds steam pressure. A three-day's supply of fuel oil is carried in the dredge tanks, one separate tank amidships and two skin tanks. The water tanks are also skin tanks in the 150 x 37-foot steel hull which has a depth of 11½ feet. The delivery of fuel oil to the boilers is controlled through mechanical burners. There are four torches in the large and one each in the smaller boilers.

The main turbine is a 1,600-hp Elliott operating at 3,600 rpm driving the main pump through 10-to-1 reduction gears. A Kingsbury thrust block takes up the thrust of the pump, and a spring bearing is located between the thrust block and the packing box on the pump to take up vibration. The main pump was designed with a one-piece case by the owners. A wood enclosure beneath the pump permits opening the manhole just ahead of the pump to remove roots and stumps which may catch in the pump impellers. At one end of the enclosure is a wire netting to catch the broken wood as it drops out and permit the water to drain to the bilge and be pumped out without any further difficulty from the wood.

C. & E. M. Photo
The pontoon line of the dredge Tchefuncta at the right, and the land line discharging into the pool at the left.

The discharge line from the main pump is carried along the starboard deck, out of the way, leaving much-needed room within the working section of the hull and also eliminates danger to the dredge by a bursting line. Five winches forward operate the spuds, swing lines and ladder. These are all equipped with 1⅛-inch cable and are driven by a pair of National Hoisting Engine Co. steam engines. The spuds are 30-inch steel cylinders 65 feet long.

The current for driving the cutter-head motor is provided by an Elliott steam turbine driving a 250-kw dc generator. This turbine is a long way from the boiler so the steam line is provided with a separator immediately ahead of the turbine.

To maintain the machinery on board the Mobile, it has been equipped with an adequate machine and blacksmith-welding shop. The machine tools include a shaper, a bolt-threading machine, a drill press, a 36-inch x 5-foot lathe, a machinists' varnished-top bench with metal drawers for supplies, a portable electric unit, a gas welding outfit, and in the blacksmith shop aft there is a forge, anvil, and heavy bending block.

Auxiliary equipment and items of interest on the Mobile include a Kohler 1½-kw lighting plant for use when the main boilers or the auxiliary turbine may be down, a forced-draft fan for the boilers, and a series of bins for the storage of nuts, bolts, and other small parts, made from old dredge pipe cut longitudinally and with shelves welded in. When set on end, these form excellent storage bins.

Drinking water for many of the dredges is hauled in daily from so... nearby town or else is distilled ca... water. On the Mobile condensed stea... is used after filtering through a carbo... filter and aerating. A novel method ... reducing the number of gnats and othe... flying nuisances during the night shif... is the use of yellow electric-light bul... in all places where the crew congregate... and in the galley. R. W. Gaylord ... master of the Mobile.

The Steam Dredge Miami

The steam dredge Miami, owned b... the Standard Dredging Co. of New Yor... has a 33-inch suction and a 27-inch di... charge line from its 28-inch main pump... The 7-foot diameter x 6-foot long cutte... head operating at 28 to 30 rpm is drive... through a 12-inch cutter and runne... shaft by a 550-hp motor. The ladder ... 72 feet long, permitting a 50-foot dig... ging depth.

Power for the steam turbines opera... ing as prime movers or driving gener... ators is provided by three Erie City Iro...

(*Concluded on next page*)

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Only the **HENDRIX** *Lightweight*
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★ 20% to 40% LIGHTER THAN OTHER BUCKETS, type for type . . . Permits use of large capacity buckets on your machines without exceeding allowable loaded weights—and use of larger buckets on long boom operations. ALL-WELDED CONSTRUCTION . . . helps reduce weight, provides greater strength, stamina and durability. PERFORATIONS . . . reduce bucket weight, permit greater intake of pay material in wet digging by letting out the water, eliminate vacuum in sticky material to give quicker, cleaner dumping. PERFECT BALANCE . . . with weight advantage, means easier handling. MANGANESE STEEL chains, fittings and reversible tooth points . . . standard equipment on all buckets. These are but a few of the built-in features which give HENDRIX Buckets greater "digability." Three types—light, medium and heavy duty—⅜ to 20 cubic yards.

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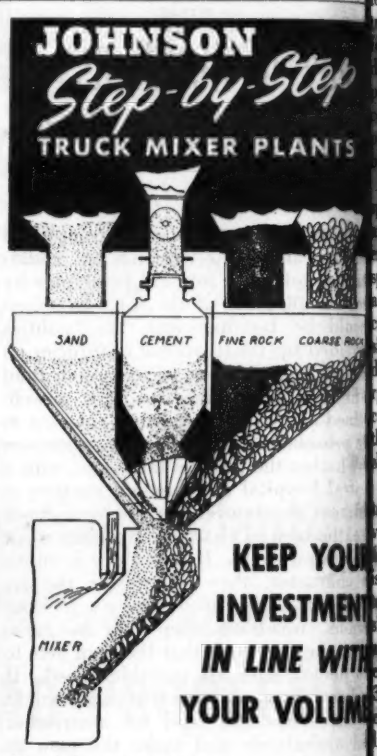
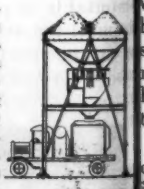
JOHNSON *Step-by-Step* TRUCK MIXER PLANTS



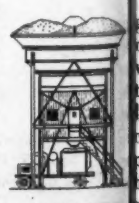
KEEP YOUR INVESTMENT *IN LINE WITH* YOUR VOLUME

Here's how to plan a central mix plant that holds your initial investment to a minimum, but makes expansion easy and economical. Diagrams at left and right show how a 30 yard Johnson Step-by-Step Bin can be progressively enlarged to 60 yards and 120 yards . . . without discarding a dollars worth of the original plant.


30-Yard
2 Material Bins

60-Yard
3 or 4 Material Bin

The Johnson Concentric Aggregate-Cement Batcher (see diagrams above) gives your plant the important advantage of (1) Pre-mixing, (2) Pre-shrinkage, (3) Faster Discharging, (4) Elimination of Cement Dust and Mixer Gumming, (5) Centralized Control. Patented design assures a full capacity mixer charge by accurate intermingling of aggregates with the cement when discharged. Many other exclusive capacity-increasing, time-saving, profit-boosting features.


120-Yard Bin

When planning a mixing plant, it will pay you to get all the facts on Johnson *Step-by-Step* Plants. Write us for details.

The C. S. Johnson Company
Champaign, Illinois

Fleet of Dredges Improves Waterway

(Continued from preceding page)

Works boilers operating with Ray burners and maintaining a pressure of 235 pounds. A 6-stage centrifugal feed-water pump maintains the proper elevation of water in the boilers, which are arranged longitudinally of the hull.

The main pump is direct-driven by a 2,000-hp steam turbine operating at 3,800 rpm with a 600-hp generator driven off the same shaft furnishing power for the cutter motor. A 435-hp steam turbine located on the starboard side operates at 3,600 rpm and is used to drive a generator furnishing power for such auxiliary services as the swing motors and circulating pump for condenser water.

On the port side forward are a pair of reciprocating steam pumps for bilge water and fire service and two 6-inch centrifugal pumps driven by electric motors for the same service. A Kerr-turbine-drive 14-inch Lecourtenay circulating pump forward furnishes water for the condensers, while there are two 4-inch pumps for providing water for the cutter bearings, and one is held as a spare.

The Miami has 43-foot steel cylinder spuds in inboard wells. These are raised and lowered from the main 5-part swing engine forward, which takes care of two spuds, two swing operations, and raising and lowering the ladder. The 550-hp cutter motor is set forward on the port side, driving the cutter shaft through reduction gears. The motor speed of 900 rpm is reduced to 28-30 rpm for the cutter shaft. The 9-inch square shaft at the upper end of the cutter drive has a sliding coupling.

A counterweight on the spud cable takes up any slack in the line and prevents undue shock to the lines in case of a slip or break, as a pair of springs is located beneath each counterweight to absorb the blow of the drop. An outside double-A frame over a hatchway above the main pump, with a monorail extending over both sides of the 154 x 38-foot hull, carries a 4-sheave block capable of lifting the 18-ton shell and liners and impeller of the main pump when actuated by a winch on a derrick barge alongside. The entire outfit can be swung to the side, picked up by the derrick barge boom, and placed on the barge and replaced by another unit in the minimum of time.

The machine shop aboard the Miami contains a Beaver bolt threader working on bolts up to 2 inches and pipe up to 4-inch. It carries a complete set of Ingersoll-Rand air tools, including wrenches and drills, a Hamilton 18-inch x 5-foot lathe, a Lincoln Electric arc welder driven by a General Electric motor, and another Lincoln driven by a Buda gas engine.

Artesian well water is used for the boilers and is hauled in by barge from Sweet Lake. Condensed steam is used for drinking water after filtering through charcoal.

The spill barge of the Miami effected great economy in operation with short discharge lines, placing the spoil bank well back from the shore and depositing the heavy material in a firm continuous levee. The 135-foot overhanging discharge pipe is carried on a barge, suspended from an A-frame, and is moved by a 3-drum hoist with a Chevrolet 6-cylinder engine for power. This company uses Ford V-8 and Chevrolet engines exclusively for service engines, as it is far easier to secure parts for repairs than for any heavier engines, especially when the spheres of work are considered.

When using the spill barge, about 300 to 400 feet of pontoon line is carried, although the dredge regularly has over 1,000 feet of floating line available. The

C. & E. M. Photo
The spill barge of the dredge Miami, showing the end discharge gate, and 20 feet back, the hinged trap in the bottom of the discharge line.

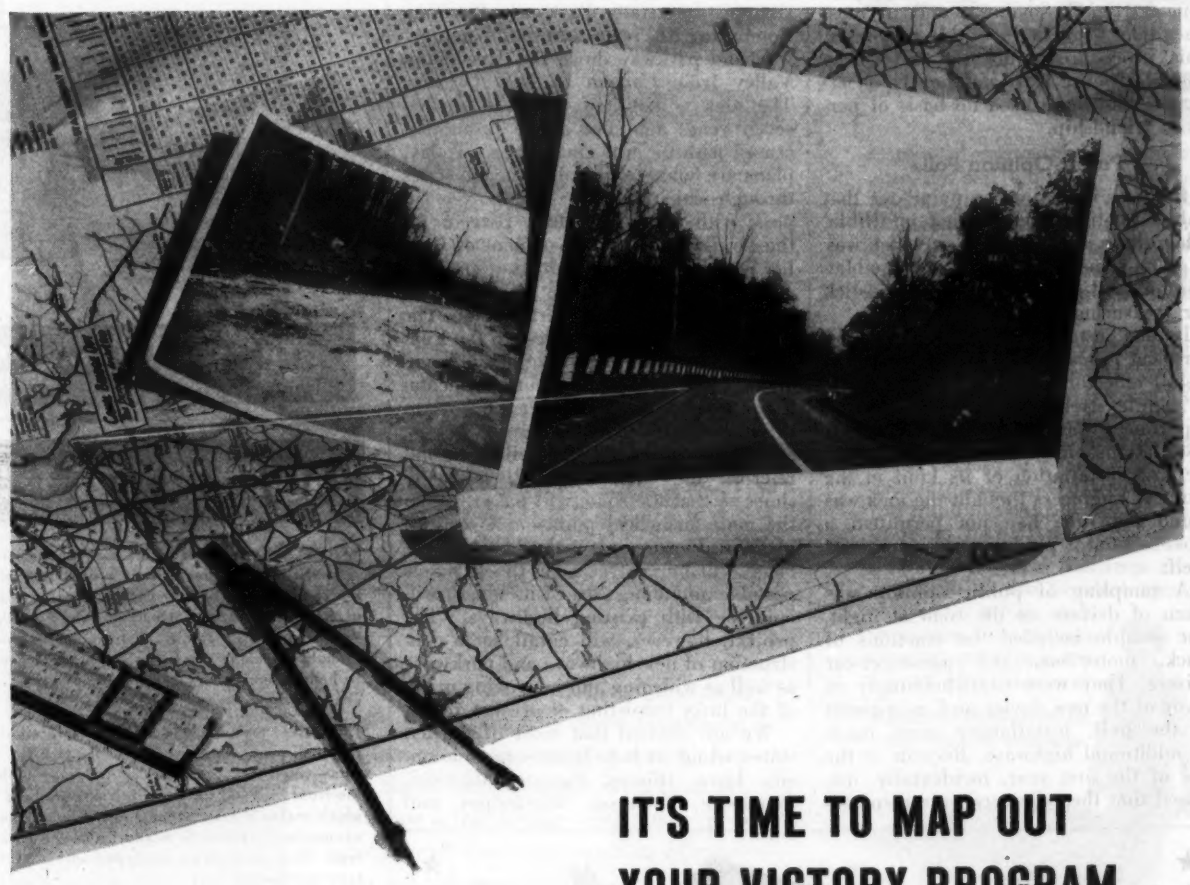
features of the spill-barge pipe are the hinged traps, one at the end and another about 20 feet back from the end of the pipe. The trap at the end rotates about a hinge on the pipe and delivers water over the top, permitting the heavy dredged material to fall from the lower end and stack, forming the backbone of the spoil bank. The other trap acts very much like the perforated pipes on long dredge lines used for placing material in hydraulic dams. It drops the heaviest material on the spoil bank at about the same point that the material is spilled by the end trap so that it is built rapidly. The water gushing over the top of the end trap loses its velocity and falls more nearly vertically, thus creating less wash.

The crew of the Miami consists of between 70 and 80 men for the three shifts. Auxiliary floating equipment includes two tugs and a speedboat capable of 35 mph powered by a 165-hp Lycoming motor. On the Intracoastal Waterway the Miami worked largely in hard red clay and fine hard-packed sand, requiring a vacuum of 12 inches and a discharge line pressure of 64 pounds. G. E. Hutchings is master of the Miami.

Indiana Traffic Shows Decrease in November

Reports from twenty-three automatic traffic counters throughout Indiana show that the volume of traffic in that state had decreased 41.9 per cent in November, 1943, as compared with the same month in 1941, and a decrease of 22.2 per cent as compared with November, 1942.

Sunday driving is steadily decreasing, according to the counters, which showed a drop of 35.8 per cent under that of November, 1942. Weekday driving fell off 17.2 per cent, and Saturday driving 27.2 per cent from 1942. It was pointed out that an automatic count of this type includes all vehicles which pass the fixed locations of the counters, and no distinction is made between trucks and passenger cars.



IT'S TIME TO MAP OUT YOUR VICTORY PROGRAM

IN THE new era of transportation that will be demanded after this war is won, the first responsibility of enlightened highway planners will be the construction, maintenance and repair of local or feeder roads. These secondary roads are not only essential for efficient local travel, they must also furnish easy access to and from the great primary routes—by land, by sea and by air.

Providing them—quickly and in sufficient volume—will give America's highway officials the greatest construction job of all time.

It's none too soon to consider your own part in the Victory picture—your own post-war plans.

Why not talk them over with the Tarvia field man? He has at his command all Barrett's 40 years of successful paving experience. He can show you how you can use Tarvia with local materials and local labor to get the most miles of smooth, easy-riding, skid-safe road from the appropriation available. He can prescribe the right grade of Tarvia and the right Tarvia method for almost any type of pavement—to satisfy almost any traffic requirement.

Phone, wire or write our nearest office—and ask the Tarvia field man to call, soon.

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Good Public Relations Aid to Highway Depts.

(*Continued from page* 55)

department continue the programs right on through the campaign, which is what was wanted.

Personal Contacts: There is no asset in public-relations work more valuable than personal contacts. When all else has failed to achieve an end, personal contact generally does the job. Personal friendship with the men who run the newspapers, radio stations, and with the leaders of organizations that mold public opinion is essential if a public relations man is to do a good job.

In a state-wide campaign in Michigan to prevent the diversion of automobile taxes, members of the public relations division wrote personal letters to newspaper editors, radio commentators and station managers, asking their support. These letters were written in an open, honest, friendly manner, and in most cases they brought favorable responses. This procedure would not have been possible, or at least not nearly as effective, had there been no basis of personal friendship.

Public-Opinion Polls

Perhaps it is time to point out that public relations men are not infallible. When there is uncertainty on which way to go on some specific policy, the public-opinion poll offers a valuable yardstick for measuring the public attitude.

In one instance a state highway department expended some $50,000 to install reflectorized night lighting along a 90-mile stretch of highway and the department was considering additional installations on other highways. It was the first installation of its kind in the country. Engineers thought the idea was sound but time had not permitted a cross-section of public opinion to assert itself.

A sampling of public opinion was taken of drivers on the road at night. The sample included the reactions of truck, motor-bus, and passenger-car drivers. They were overwhelmingly in favor of the new device and, as a result of the poll, installations were made on additional highways. Records at the end of the first year, incidentally, disclosed that the reflectors were responsible for a sharp reduction in night accidents. This speaks well for the judgment of both the engineers and the public.

A Job for Everyone

It can be stated, without fear of contradiction, that a public-relations program cannot accomplish anything worthwhile for a poor organization. But public relations can make the public aware of the good work of a sound organization.

Finally any public-relations program, to be successful in the long-range view, must be carried on with every man and woman in the organization contributing to the well-being of the program.

Prepared from a paper presented before the Committee on Public Relations, American Association of State Highway Officials, in Chicago, Ill., December 2, 1943.

A Post-War Highway Down the Mississippi

A. P. Greensfelder of St. Louis, well-known constructor and active in the affairs of the Associated General Contractors of America, is sponsoring the Mississippi Interstate Parkway Planning Committee to create and build a highway and parkway down the Mississippi Valley from Canada to New Orleans. The idea is not new, as it originated seven years ago, but active promotion ceased with the war emergency. Today, plans are being prepared in the ten states through which the proposed project will pass, with DeWitt Pyburn, Director of the Louisiana State Department of Public Works, in charge for the southern section, and Rex Green of St. Paul, Minn., piloting the northern section. The recent Congressional request to the Public Roads Administration for recommendations on post-war transcontinental highways has given further impetus to this project, which is distinguished from express highways in that it will cross and re-cross the Mississippi River many times so that the route will pass through the main historical points and sections of natural beauty. It is the idea that the route will be kept as near the River as possible and along part of its length will coincide with existing highways. The project, however, will entail some construction of new highways and parkways as well as widening and improving many of the links consisting of present roads.

We are advised that most of the ten states, which include Minnesota, Wisconsin, Iowa, Illinois, Kansas, Missouri, Tennessee, Arkansas, Mississippi, and Louisiana, have passed enabling acts designating their respective highway departments or other agencies as the official body to cooperate with Federal authorities in the survey and construction of this parkway. Tentative plans call for Federal construction over state-acquired land and it is expected that at the northern end the route will connect with the Alaska Highway through scenic Canadian highway. This Mississippi Parkway would extend for 1,5 miles as a hard-surfaced scenic and historical route which will open up access to the Mississippi for the entire length of this great inland waterway.

PAN AMERICAN WORLD AIRWAYS

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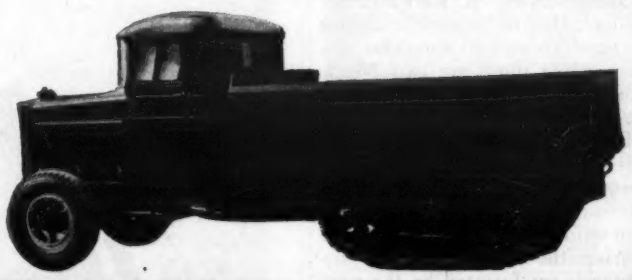
LINN HAFTRAKS

to build and maintain their vital airports throughout Central and South America

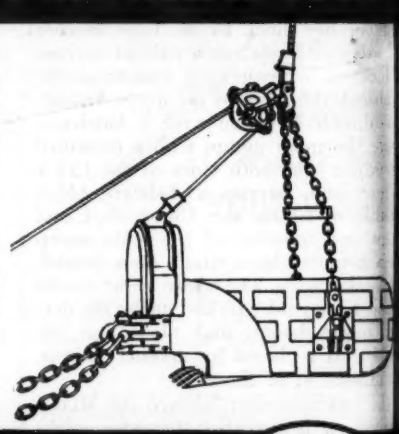


THE LINN MANUFACTURING CORPORATION
MORRIS, NEW YORK

YAUN'S BASKET TYPE ALL-WELDED BUCKET

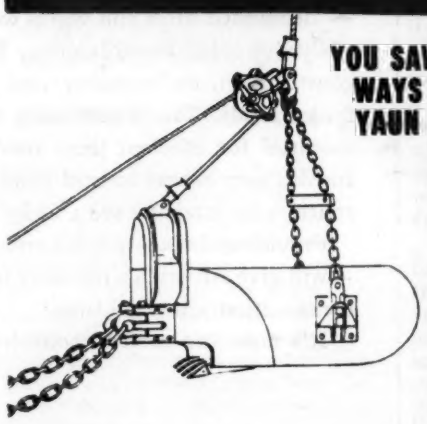
YAUN'S basket type bucket is an innovation in the digging field. It is a duplicate of the shell type, except that the rear is made of heavy flat bars, instead of sheet steel. When handling wet dirt, there is no suction to hold back the discharge. It is designed to handle any loose material, except "soup." The dirt does not fall through the holes.

This basket type bucket has the same arch as the shell type, which is proof against distortion—you'll never see a Yaun Bucket with the front "caved" in. The lip is also stellited, which makes it last longer and has the same connection between arch and lip as the shell type. These buckets are equipped with American manganese tooth bases with removable tooth points.



YAUN'S SHELL TYPE ALL-WELDED DRAGLINE BUCKET

Some Advantages of BASKET-TYPE BUCKET
100 per cent load in sticky dirt.
Fill will dry quicker.
Machine will be subjected to less strain.



YOU SAVE THREE WAYS WITH A YAUN BUCKET:

1. More pay load, less bucket weight, same gross weight, more yards per cycle at same cost.
2. Faster dumping means more cycles per shift at no additional cost.
3. Less dead weight to swing back, swing faster, return and more cycle per minute at no additional cost.

YAUN'S shell type bucket is furnished with American manganese tooth bases and removable tooth points. The bottom of the lip is stellited and as the top wears, the bottom remains and causes the lip to become exceedingly sharp. The lip is guaranteed to remain sharp during the life of the bucket. The arch is so constructed that it adds strength and durability to the front of the bucket.

The weight of this bucket is about one-third lighter than that of any other bucket of similar capacity, yet you'll find it will last longer. This will naturally enable you to move from 30% to 50% more dirt at no increase in cost—often the difference between profit and loss of a job.

Patented

YAUN DRAGLINE BUCKETS & MFG. PLANT
BATON ROUGE, LOUISIANA

★ Use 5 or 10 Buckets to each unit

★ 15 Seconds for loading or dumping

Use the LOAD LUGGER Trade Mark Reg. for Stripping

. . . quarrying . . . feeding crushers . . . road building . . . construction jobs . . . and moving any bulk materials where loading is done by hand.

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It gives full details of this modern material handling unit

Brooks LOAD LUGGERS mounted on your trucks will help you complete your contracts more quickly and profitably in 1944. The saving in manpower, maintenance and equipment costs are important in contract jobs. If you are short of trucks, then mount a LOAD LUGGER on the chassis and make each truck do extra duty.

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Distributors in all Principal Cities

Brooks EQUIPMENT AND MFG. CO.

Roller of 2-5 Tons Compact, Effective

Engineered for economical operation where the going is tough, the Pierce-Bear variable-weight roller is compact and easy to operate. Its narrow rear roller provides heavy-duty compression, and its weight may be varied from 2 to 5 tons. Built-in water tanks provide for wet rolling, and power is furnished by an Allis-Chalmers industrial heavy-duty Model B gasoline engine.

This roller has been on the market for some time, but was recently taken over from the Pierce Governor Co. by the H. W. Lewis Equipment Co., 431 Hoefgen Ave., San Antonio, Texas, which has adapted it to the needs of the Army.

A new catalog covering the features of design and construction of the Pierce-Bear roller is now in preparation. Copies may be secured by interested contractors and state and county highway departments, as soon as they are available, direct from the manufacturer. Just mention this magazine.

The Pierce-Bear variable-weight roller.

A.S.T.M. Meeting

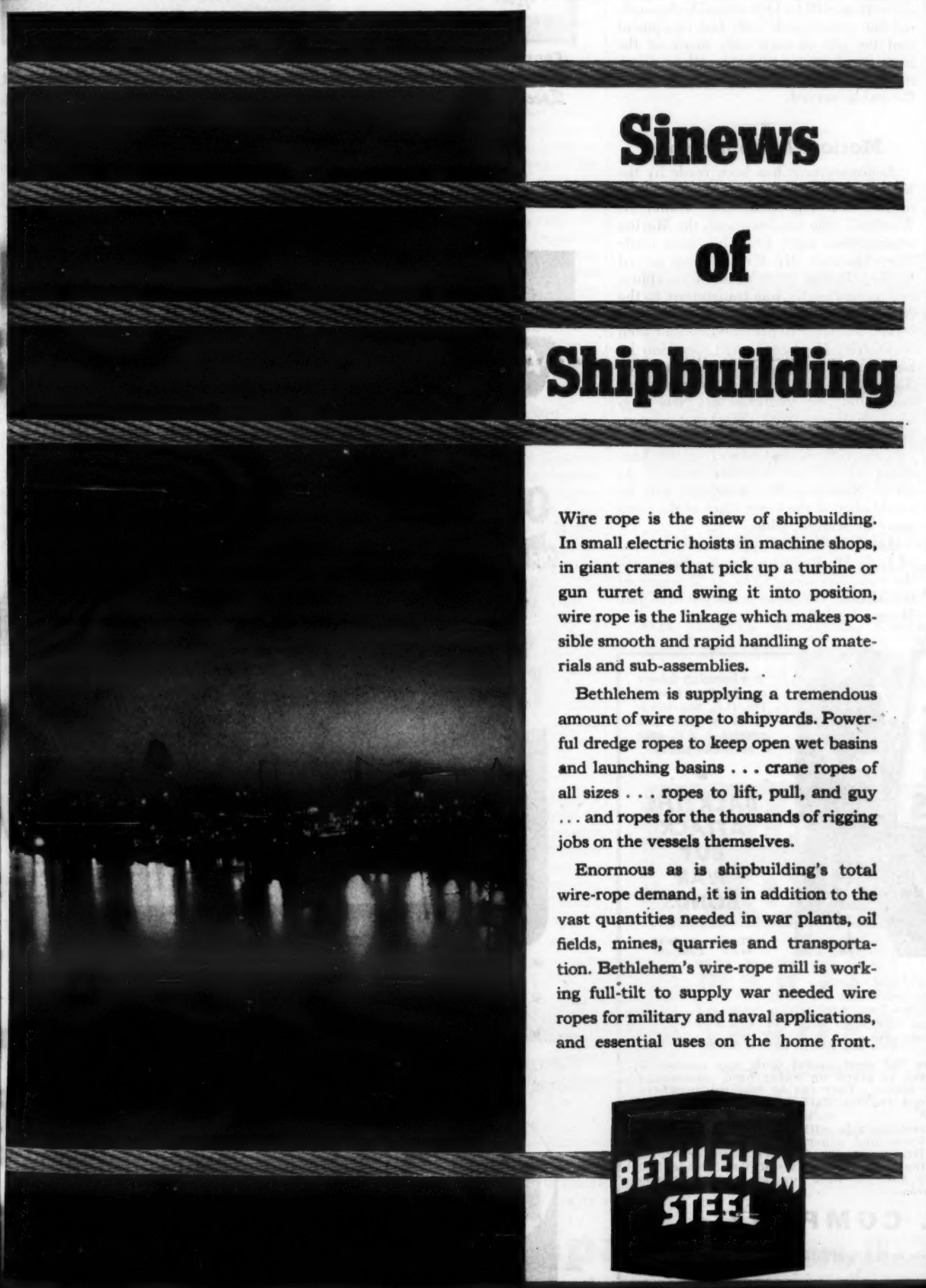
The American Society for Testing Materials will hold its 1944 Spring Meeting and Committee Week at the Netherland Plaza Hotel, Cincinnati, Ohio, February 28 to March 3. The technical feature of the meeting will be a symposium on the application and uses of synthetic rubber.

Stilley Is LeTourneau's Chief Field Engineer

Howard L. Stilley, veteran employee of R. G. LeTourneau, Inc., Peoria, Ill., has been promoted to Chief Field Engineer, succeeding Ken F. Park who resigned to join the Caterpillar Tractor Co. Mr. Stilley joined LeTourneau in 1936 after spending six years with the Illinois Division of Highways. In 1937, when the LeTourneau field engineering department was organized with Mr. Park as Chief, Mr. Stilley became his assistant. In February, 1940, Mr. Stilley was made Assistant West Coast Manager, District Representative and Field Engineer for LeTourneau, with offices at the Stockton, Calif., headquarters of the firm. Mr. Stilley, who remained at Stockton until recently, is already fulfilling his new duties at Peoria.

New Sika Sales Manager

Warren J. MacEvoy has recently been appointed Sales Manager of Sika Chemical Corp., Passaic, N. J., manufacturer of Plastiment and Sika waterproofing compounds. Mr. MacEvoy was formerly Vice President and General Superintendent of MacEvoy Shipbuilding Corp., Savannah, Ga., which has been constructing reinforced-concrete barges for the U. S. Maritime Commission.



Sinews of Shipbuilding

Wire rope is the sinew of shipbuilding. In small electric hoists in machine shops, in giant cranes that pick up a turbine or gun turret and swing it into position, wire rope is the linkage which makes possible smooth and rapid handling of materials and sub-assemblies.

Bethlehem is supplying a tremendous amount of wire rope to shipyards. Powerful dredge ropes to keep open wet basins and launching basins . . . crane ropes of all sizes . . . ropes to lift, pull, and guy . . . and ropes for the thousands of rigging jobs on the vessels themselves.

Enormous as is shipbuilding's total wire-rope demand, it is in addition to the vast quantities needed in war plants, oil fields, mines, quarries and transportation. Bethlehem's wire-rope mill is working full-tilt to supply war needed wire ropes for military and naval applications, and essential uses on the home front.

BETHLEHEM STEEL

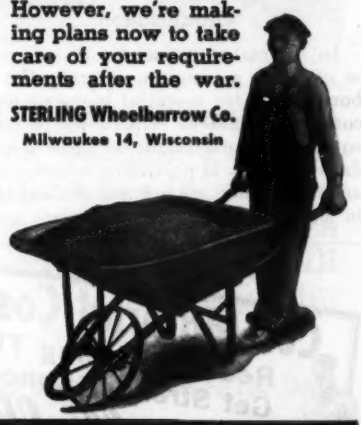
Clever People these CHINESE!

Cargo-carrying wheelbarrows actually sail along the streets of the Orient. With typical Chinese ingenuity, a mast with sail is fixed at the front of the barrow, thus speeding up deliveries and lightening the task of the operator.

Obviously, today, Sterling Wheelbarrows do not have sails, but they are equipped with modern anti-friction bearings that enable heavier loads to be carried at a faster speed. Sterling balanced, easy-wheeling qualities simplify war-time material handling problems.

Sorry, only a few Sterlings are available at the present time. However, we're making plans now to take care of your requirements after the war.

STERLING Wheelbarrow Co.
Milwaukee 14, Wisconsin



Sterling WHEELBARROWS

A 4307-¼

Change of Address

(Mail to Contractors and Engineers Monthly, 470 4th Ave., New York 16, *today*)

From _____
(Former address)
_____
_____

To _____
(New address)
_____
_____

Name_____
Firm_____
Position_____

Rotary and Rock Salt Aid County Highways

(*Continued from page 47*)

plows had removed the major part of the fall. This ice-prevention technique has provided bare dry pavement very quickly and eliminated the time and expense of repeated sanding of icy patches on grades. Milk trucks moving over these roads at all hours now are assured that hazardous stretches are safeguarded.

Some 90 miles of 16-foot-wide roads received the rock-salt applications in the winter of 1942-1943. Approximately 80 tons of rock salt were used, to combat the frequent freezing rains, sleet storms and 40-inch snowfall. Rock salt will have a permanent part in our winter-maintenance program because the work done so economically has won public approval.

Plowing Equipment

The Bros rotary snow plow has also been a big help in cutting through the heaviest drifts. This machine represents an investment of $18,000 but has demonstrated its ability to save substantial sums in opening roads, otherwise impassable, with great speed. Schoharie was the first county in the state to use this machine which has been so successful in the West.

Local drifts are often so deep and dense that even the sturdy locomotive on the famed Middleburg and Schoharie Railroad was unable to get through several years ago and had to be pulled out by county equipment.

The county owns four trucks with capacities ranging from 2½ to 7 tons, one power grader, and one tractor, in addition to the rotary plow. Other equipment used, consisting of thirty-four trucks from 1½ to 10-ton capacity and fifteen tractors, is rented from the townships and operates under the direction of the township superintendents.

Organization

In November it was found necessary to establish a program whereby the labor needed for essential highway work could be retained. Operators of town equipment are guaranteed three 8-hour days per week at prevailing county rates and, when they are not actually engaged in snow removal, other necessary work is provided. Heavy-truck operators receive 75 cents per hour, medium 70 cents, light 65 cents, and laborers on snow removal, 60 cents.

Under the directive for snow removal for the year 1943-1944, the township superintendent who is charged with the supervision of all equipment and the direction of plowing snow in his assigned section must start maintaining two-way traffic on roads as soon as the snow has reached a depth of 3 inches, at any time day or night. In the event of a breakdown or extreme weather, additional equipment and the Bros rotary may be summoned to give assistance. The county foremen patrol frequently for ice conditions. While there has been nothing to equal the 4-foot fall during the historic blizzard of '88, many storms bring 6 to 18 inches and two-day blows are not infrequent. There are local vagaries of weather so that every storm is somewhat different, and requires adjustments of overall plans.

Ten years ago, Schoharie County was keeping open only 74 miles of county road; this year, 222 of the 225 miles in the system will be kept passable throughout the winter and, with fast equipment and the use of rock salt, many of the hazards of winter driving will be eliminated, a step which has found favor with the public served.

Marion Appointments

Announcement has been made by the Marion Steam Shovel Co., Marion, Ohio, of two new appointments. Walter N. Westland, who has been with the Marion organization since 1925, has been made Sales Manager. Mr. Westland has served in the Marion New York Sales Office, and subsequently was transferred to the New England Sales Branch where he served as Sales Representative and then as District Manager, which position he held until his recent appointment as Sales Manager. During the past year and a half, he combined his New England activities with Washington contacts, where he has worked closely with various Government offices in the handling of Marion business there. As Sales Manager, Mr. Westland will be established at the home office of the company in Marion, Ohio.

Another Marion appointment is that of L. C. Mosley, who also has been with the company since 1925, as Manager of the Mining Division, to succeed the late Homer Littlefield.

Baker Official Dies

Edward E. Staley, Chairman of the Board of Directors of the Baker Mfg. Co., Springfield, Ill., died recently at his home in Springfield, at the age of 72 years. Mr. Staley became Secretary of the Baker organization in 1917, and its President two years later. He was elected Chairman of the Board in 1940, being succeeded as President by his son.

Under Mr. Staley's leadership during his twenty years as President, the Baker Mfg. Co. made rapid advances in the manufacture of bulldozers, snow plows and construction equipment. Baker equipment today is building roads and airports on every fighting front.

Construction Experience Has Proved Reinforced Pavements Permanent and Low in Maintenance Cost. When Using Available Reinforcing Steel *Specify* Laclede's Complete Line of Proved Pavement Reinforcement.

- Welded Wire Mesh
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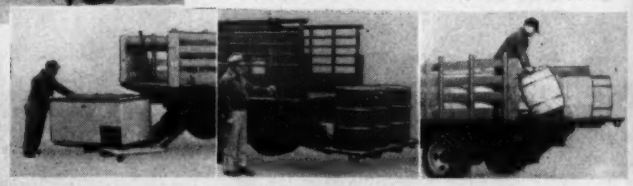
GENERAL OFFICES ARCADE BUILDING ST. LOUIS, MISSOURI

ANTHONY HYDRAULIC
"TAILGATE LOADER"
CAPACITIES 750 LBS. TO 1500 LBS.
ONE MAN NOW DOES THE WORK OF THREE

Old Way-Requires 3 Men

QUICKLY-EASILY MOUNTED ON TRUCKS NOW IN SERVICE OR ON NEW TRUCKS

★ SOLVES MANPOWER SHORTAGE
★ CAN PAY FOR ITSELF IN 30 DAYS



One man slides heavy cooler onto lowered tailgate. One man operates lever to raise 3 heavy drums. One man easily handles barrels raised flush with floor

NEW WAY with TAILGATE LOADER

★ SAVES MANPOWER! One man now does what three or more formerly did.
★ CUTS LOADING AND UNLOADING TIME! Trucks are loaded and unloaded faster — keeps them on the move.
★ REDUCES PERSONNEL ACCIDENTS! Loads are lifted to body or lowered to ground by powerful hydraulic hoist mechanism controlled by one convenient lever.
★ REDUCES ACCIDENTAL DAMAGE TO VALUABLE MERCHANDISE! No skids, chains or cables to break or slip. Minimizes your damage losses.

ANTHONY'S ZB PLATFORM HOIST — Makes inexpensive dump body out of platform, stake or grain body

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The low price will surprise you. Write or wire for complete information. — Address: Department D-21

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Get Stronger Concrete
with Mall VIBRATORS

GASOLINE POWERED 3 H.P. UNIT

Equipped as a Concrete Surfacer

★★Immediate delivery on Gasoline Powered 1½ H.P., and wheelbarrow or round base mounted 3 H.P. units on suitable priority.

BACK THE ATTACK BUY WAR BONDS

Placing a Stiff Mix Concrete

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★ *Eliminate honeycombs and voids.*
★ *Get a better bond with reinforcement and a stronger water tight job.*
★ *Strip forms earlier.*

● MALL Gasoline Powered Vibrators are the most useful tools any contractor could own. They are ruggedly constructed to stand up under hard, continuous usage. They operate in the most remote places. They can be wheeled anywhere on the job. In addition, the variable speed engines start easily, run all day on very little fuel and require little attention.

8 swivel-fitted attachments, quickly interchangeable with the vibrating element, are available for Wet Wall Rubbing, Form and other Sanding, Sawing with Circular Saw, Wire Brushing, Grinding, Drilling in Wood, Brick, Steel or Stone, Pumping and Sharpening Tools. With the present scarcity of time, labor and materials and a competitive future facing you, the need for this equipment was never greater. *Write at once for full information.*

MALL TOOL COMPANY
7743 SOUTH CHICAGO AVE. CHICAGO 19, ILL.
Offices and Distributors in Principal Cities

Post-War Planning Guiding Principles

Preparedness, Magnitude, Need, Competitive Bidding, Use of Man-Power, and the Stimulation of Industry

THE Project Committee for Post-War Planning of the Highway Research Board has derived certain findings and conclusions from its studies which may be expressed briefly as objective principles. These are:

1. Preparedness for peace is as essential to the continuing national welfare as preparedness for war. A complete readiness of highway construction projects against the impact of demobilization is highly essential to the stabilization of the national economy. Speedy provision of legislative authority is vital for the provision of needed surveys, plans and land acquisitions.

2. The magnitude of a post-war program of highway construction must be determined by the need for these facilities, in relation to other national needs, and governed by the then existing economic conditions. In view of the uncertainty of post-war conditions, planned projects should be programmed independently and in excess of anticipated financial resources before they are actually needed.

3. The inclusion of projects in a post-war program should be contingent on the provision of needed construction, and both public and private participation should be predicated on the need for those types of facilities which may be economically sound and which will obviate recourse to or necessity for made-work programs.

4. Efficiency and economy will obtain in the post-war period from the maximum feasible use of the itemized-unit bid-price competitive contract method of highway construction.

5. In the post-war period, the engineering supervision of active projects and the continued planning of long-range projects will provide a stabilizing influence on the utilization of engineering man-power.

6. Substantial employment benefits, incidental to the serving of post-war needs for highway construction, will result directly from scattered projects, located close to sources of unemployment, and indirectly in the widespread stimulation of allied industry activities.

Need for Highway Construction

The Committee believes that the foregoing general principles should properly circumscribe a program of highway construction in the post-war era, irrespective of the scale upon which such a program may be resumed. Additional evidence, not directly included in the assigned topics but made available to the Committee, indicates the existence of extensive highway needs in each of the several highway administrative jurisdictions, the provision of which will probably exceed the normally available financial resources of each. Such needs stem from three general causes which are both immediate and remote.

In consideration of the rapid pre-war expansion of automotive transport, virtually all agencies of highway administration have experienced difficulty in obtaining sufficient funds to keep the construction and maintenance of roads satisfactory for traffic needs. As a result, the highways are becoming, in many cases, inadequate, obsolete and deficient. The war period has further necessitated rigid curtailment of much normal replacement and necessary maintenance despite continuing heavy traffic. The physical conditions resulting from war deferment of highway activity will require early correction in the post-war period.

The concentration of population into compact areas and the resulting concentration of motor-vehicle travel has injected new highway needs into the field of highway planning. The principal need here is the elimination of metropolitan congestion, which is the product of concentrated motor-vehicle ownership and characteristic short-range travel.

The determination of the magnitude of a post-war program is, therefore, the measure of the need for new highway facilities to meet new traffic requirements and the need for making up past deferments to meet the current traffic requirements in the shortest possible time. The actual provision of the needed facilities faces definite financial limitation. It is probable that the overall highway receipts, which may reasonably be anticipated in all highway administrative jurisdictions, are not equal to the overall demand for highway improvement. Under existing laws there is no reasonable expectation that funds will be distributed among the several highway jurisdictions according to their respective highway needs.

Changes in Administration

The Committee believes that the existing administration of highway systems divided among the state, the counties, cities and other local units often results in extravagance. The Committee feels that greatly augmented funds will not completely solve all our highway problems. We must reexamine our systems and their jurisdictions.

The Committee, therefore, recommends that revision of highway systems, state and local, urban and rural, and methods of fund distribution be studied in relation to traffic use. Since motor-vehicle travel transcends the administrative jurisdictions established to provide the roadbed facilities, there is need for an overall determination of highway requirements in relation to available highway funds.

The Committee endorses the principles of the Federal-Aid Act with respect to the Federal-state relationship and recommends the consideration of the extension of these principles to the state-local relationship, and for equality of matching of the Federal-state and state-local funds to preserve the mutuality of interest.

The Committee recognizes the difficulties of an early resolution of current highway administrative problems but believes that a long-range program moving in the general direction of these recommendations and in general response to these principles will foster a desirable continuity in administrative planning and direction of post-war highway activities, and will operate to provide a maximum of highway service within the limits of realizable highway revenue.

A portion of the report submitted by the Project Committee for Post-War Planning, Charles M. Upham, Chairman, to Professor Roger L. Morrison, Chairman of the Committee on Economics, Highway Research Board.

New Pump Book

A new booklet on Marlow pumps, described as a condensed library of pump information, has recently been issued by Marlow Pumps, Ridgewood, N. J. Listing and describing the extensive Marlow line of contractors' pumps, this well-illustrated booklet contains a large section of engineering data to be kept at hand for the solution of pumping problems.

Copies of "Marlow Pumps" may be secured free by interested contractors and engineers direct from the manufacturer by referring to this item.

New All-Purpose Folder On Calcium-Chloride Uses

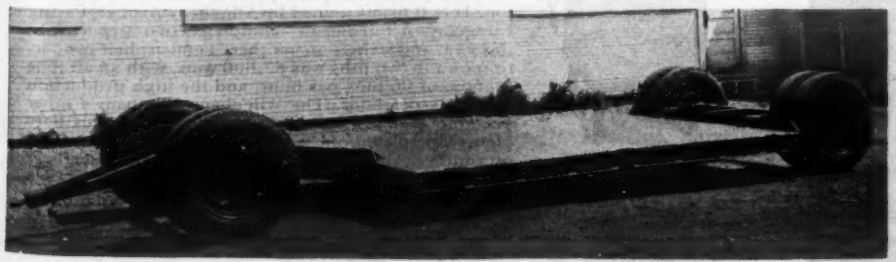
A new folder on the many uses of calcium chloride has just been issued by the Solvay Sales Corp., 40 Rector St., New York 6, N. Y. Written in simple non-technical language, this folder describes the use of calcium chloride for concrete, laying dust, killing weeds, thawing and skid-proofing ice, fire protection, weighting tractor tires with non-freeze solutions, and other services.

Free copies may be secured by interested contractors and state and county highway engineers direct from the manufacturer by asking for the "all-purpose" folder and mentioning this magazine.

The Buffalo-Springfield 3-Axle Tandem is definitely "bad news" for bumps. For the present, these unique rollers are in service on many fronts, building airport runways and military roads. After the war they will be available for the great peacetime public works program.

THE BUFFALO-SPRINGFIELD ROLLER CO., SPRINGFIELD, OHIO

BUFFALO-SPRINGFIELD ROLLERS



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EDGEWATER BEACH HOTEL CHICAGO JANUARY 18 - 20, 1944
PHOTOGRAPH BY CONTRACTORS AND ENGINEERS MONTHLY
EDGAR J. BUTTENHEIM, PUBLISHER.

A.E.D. 1944 Officers Elected in Chicago

The officers of the Associated Equipment Distributors for 1944, elected at the group's Twenty-Fifth Annual Meeting held in Chicago last month, are as follows:

President, G. W. Van Keppel, G. W. Van Keppel Co., Kansas City, Mo.; Executive Vice President, H. O. Penn, H. O. Penn Machinery Co., New York City; Vice Presidents, Frank B. McBath, Columbia Equipment Co., Portland, Ore.; A. E. Hahnan, Tractor & Machinery Co., Atlanta, Ga.; and R. S. Patten, Patten Tractor & Equipment Co., Chicago, Ill.

W. W. Bucher, R. E. Brooks Co., New York City, and C. F. Winchester, Washington, D. C., were renamed Treasurer and Executive Secretary, respectively.

The Regional Directors include John Gorman, Tractors, Inc., Providence, R. I.; H. O. Penn, Executive Vice President; George N. Beckwith, Beckwith Machinery Co., Pittsburgh, Pa.; Robert A. Carter, Virginia Tractor Co., Richmond, Va.; A. E. Hahnan, an A.E.D. Vice President; W. T. Walsh, W. T. Walsh Equipment Co., Cleveland, Ohio; R. S. Patten, a Vice President; R. S. Rosholt, Thorman W. Rosholt Co., Minneapolis, Minn.; G. W. Van Keppel, the new President of the A.E.D.; Hal M. Davis, R. B. Everett Co., Houston, Texas; A. F. Garlinghouse, Garlinghouse Bros., Los Angeles, Calif.; Frank B. McBath, Vice President; E. F. Higginbotham, Road Builders Equipment Co., Memphis, Tenn.; J. W. Moore, H. W. Moore Equipment Co., Denver, Colo.; and J. W. Crothers, Geo. W. Crothers, Ltd., Leaside, Toronto, Canada.

More than 1,000 equipment distributors, manufacturers, and others interested in the construction equipment industry attended the various sessions, at which problems pertinent to the present and future of the industry were discussed.

WELLMAN WILLIAMS TYPE BUCKETS

Staying Power

Wellman Buckets stay right in there slugging it out in the toughest, roughest going.

Multiple Rope & Power Arm Types
Dragline • Power Wheel • Dredging
Special Service Buckets
⅜ to 16½ Yd. Capacities

WELDED ROLLED STEEL CONSTRUCTION is one big reason for LONGER BUCKET LIFE!

Send for free bulletin

Tell us about your particular requirement and we will send full description of construction and special features in bulletins which clearly prove why YOUR NEXT BUCKET SHOULD BE A WELLMAN-WILLIAMS.

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Sales and Service Agencies in principal cities

2 Airport PAVING JOBS COMPLETED IN 1943 — Another Started

With This H&B PORTABLE Asphalt Plant

The portable asphalt plant shown above—one of four H & B plants owned by Allegheny Asphalt Paving Company of Pittsburgh—completed two airport jobs in 1943, and started on another. Total asphalt production on the two jobs was 87,600 tons, with an all-time average of 96 tons per hour, and the high production 132 tons per hour. The Allegheny Company's other portable plant—a smaller unit used as an auxiliary plant—completed one airport job in 1943 and started on another. Allegheny Company officials attribute these production records to the efficiency of the double driers, which permitted continuous operation. For many weeks the plants operated a total of 20 hours per day. Literature on H & B portable and stationary asphalt plants will be sent on request.

The FLUIDOMETER AUTOMATIC METERING SYSTEM
Saves time, materials—insures uniformity. For all types of plants.

HETHERINGTON & BERNER Inc.
INDIANAPOLIS 7, INDIANA

Hetherington & Berner

C. & E. M. Photo
Buggying concrete for the sewer barrel above the spring line.

Concrete Sewer Laid Despite Difficulties

(*Continued from page* 11)

The trench banks were so well controlled that there was little or no settlement.

When the excavation had been completed to grade, 12 and 10-inch vitrified-clay pipe was installed in a trench below grade, encased in concrete, and used to handle the sanitary-sewage flow under a pressure head during construction. This line will be plugged and the sanitary sewage put through the new combined sewer when construction has been completed.

Forms and Concrete

The only form work for the invert was a circular segment made up of 1 x 4-inch tongue-and-groove lumber set parallel with the center line of the sewer and held in position with 2-inch ribs cut to the proper radius. This form was set accurately to line and grade and braced to the trench sheeting.

Concrete for this pour was delivered to the job in three 3½-cubic-yard Smith truck mixers from the plant of the Pacific Coast Aggregates Co. and was handled by varying methods dictated by the particular conditions governing the pour. Where possible it was delivered by chute directly from mixer to forms but, where necessary, was handled in two-wheel concrete carts and deposited through a sectional tremie or elephant trunk.

When the bottom had attained sufficient strength, the brick invert was placed by a bricklayer and two helpers, and the inside barrel forms were set. These consisted of four segmental sections of form, 8 feet long, consisting of 2-inch radial ribs on 24-inch centers and 1-inch tongue-and-groove lumber nailed to the ribs in the direction of flow. Four sections formed the remainder of the full circle and were cross-braced inside. On the outer top half of the sewer, two sections of wing forms, constructed in a manner similar to that of the inside barrel forms, were placed as pouring progressed and anchored down to the side sheeting. A crew of two carpenters with four helpers handled the setting of the outside forms as the pouring progressed while the crew handling concrete varied from three to eight, depending on whether the concrete could be chuted into final position from the truck mixers or had to be wheeled and deposited through a sectional tremie. All concrete was vibrated by an Ingersoll-Rand pneumatic vibrator taking air from the trench-side pipe line.

Major Quantities

The major quantities included in this contract were:

Plain concrete sewer, 6-foot diameter	781 lin. ft.
Junction structures	2
Taper connection	1
Plain concrete sewer (egg shape), 3 x 4½-foot	975 lin. ft.
Manholes	11
Subdrain, vitrified-clay pipe	1,900 lin. ft.

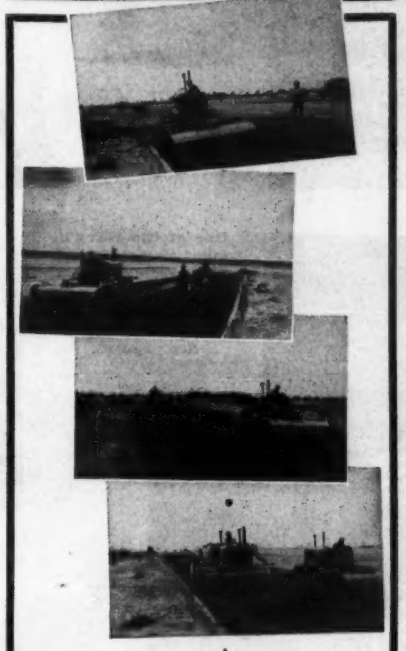
Personnel

The San Francisco Department of Public Works awarded the contract for the construction of the Ingleside sewer to Martin Murphy of Albany, Calif., on his low bid of $112,741. Mr. Murphy acted as his own Superintendent on the job and the Department of Public Works was represented by James Kazan as Resident Engineer. The work was under the direction of John J. Casey, City Engineer, and C. M. Taylor, Chief of the Construction Division.

New Goodrich Plants

The B. F. Goodrich Co., Akron, Ohio, will establish manufacturing operations in DuBois, Pa., next month, under the managership of A. J. Baker, former Manager of Akron factory employment. This newest Goodrich production unit will manufacture products in which rubber and textiles are employed.

This company also recently announced its decision to build a new tire manufacturing plant in Miami, Okla. Construction of this plant will start early this year.



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Send for job facts now.

ORDNANCE 8 UNITED STATES ARMY
Awarded Oct. 30, 1943

ARIENS COMPANY
BRILLION, WISCONSIN

STRAYER PORTABLE CONCRETE PLANTS

20 to 40 YARDS PER HR.

Make 20 to 40 yards of specification concrete per hour on the job. One-man operation and a helper to handle cement bags. One hour to set up. Move from job to job. Write for booklet today.

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Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

Equipment for Sale

Barber-Greene Hot Asphalt Plant, Utility Size. Less than two years old.

Two Seventy-horsepower Boilers
Six Storage Tanks
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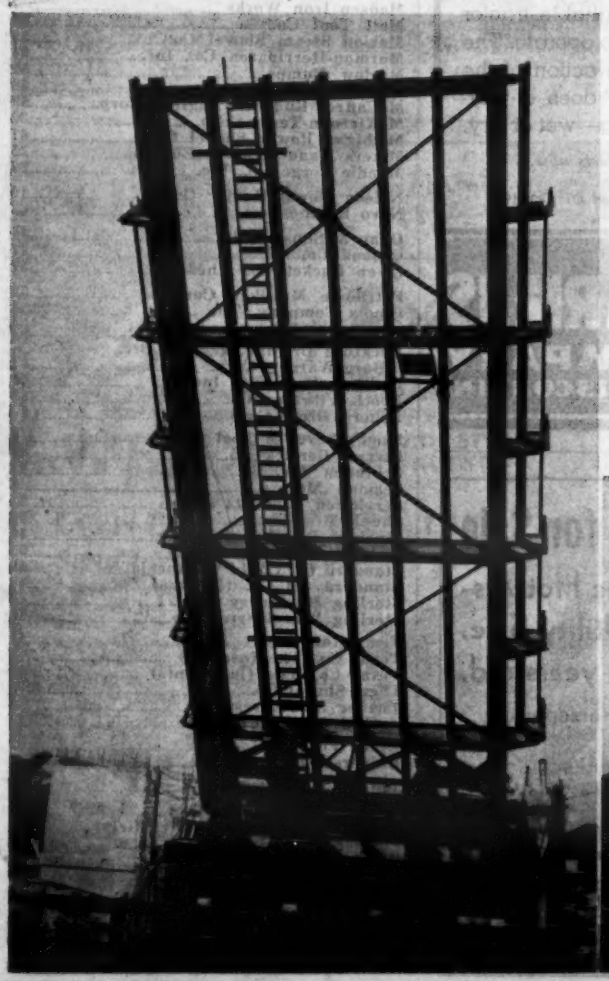
Scenes on the Brooks Construction Co. 19.64-mile highway-widening contracts in Indiana. Left, the depth of the widening trench was checked frequently by this home-made device, a carpenter's level with an extension and depth gage. Right, a well-filled trench, showing compacted base course, laid in two 3-inch layers, in the foreground and the binder course above. Below, John Brooks, contractor, and, at right, Norman F. Schafer, Maintenance Engineer, State Highway Commission of Indiana.
See page 40.

C. & E. M. Photos

One of the Navy's giant timber blimp hangars, showing an installation of specially designed Byrne doors.
See page 16.

Minn. Dept. of Highways Photo

The type of one-way snow plow used by the Minnesota Department of Highways. Note the shape and length of overhang at the top of the plow to roll the snow sideways rather than throw it back over the cab of the truck. Unfortunately this is not a typical winter scene along Minnesota's highways, but a bad storm may produce, and the state maintenance forces must be prepared for drifts like this.
See page 1.



One of the many bridge structures on the recently completed Key West Overseas Highway in Florida. Left, the north leaf of the Jewfish Creek double-leaf bascule span during erection. Below, a derrick barge swinging a floor beam into place on the Jewfish Creek Bridge. Right, Field Editor Frank B. Sarles (at left) interviews M. V. Moore, Project Engineer (center), and J. S. Hucks, Superintendent for Cleary Brothers Construction Co., contractor for the project.
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C. & E. M. Photos